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ORIGINAL ARTICLES.

ADDRESS ON THE OBJECTS OF THE AMERICAN MEDICAL TEMPERANCE ASSOCIATION,

AND ON THE PHYSIOLOGICAL AND THERAPEUTIC DIFFERENCES BETWEEN THE CARBO-HYDRATES CONSTITUTING PROXIMATE ELEMENTS OF LIVING VEGETABLE AND ANIMAL BODIES, AND THOSE RESULTING FROM BACTERIOLOGICAL OR RETROGRADE ACTION.

Delivered at the Annual Meeting in Detroit, June 9th, 1892.

BY N. S. DAVIS, M.D., LL.D.,

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Ladies and Gentlemen:—We are assembled to note the first anniversary of this Association, which was organized in Washington, D. C., May, 1891. The objects had in view by those who participated in its organization as declared on that occasion were, "to advance the practice of Total Abstinence in and through the medical profession, and to promote investigation as to the action of alcohol in health and disease; and to form a bond of union among medical abstainers all over our country." That those three objects are of sufficient importance to challenge the attention of every well informed and unbiased member of the profession, must be admitted by all. Especially is this true, if we consider the fact that more than $800,000,000 are annually paid for alcoholic drinks, fermented and distilled, by the people of this country; over $700,000,000 by the people of Great Britain; and nearly in the same ratio by all the nations occupying the Continent of Europe; and all this without returning so much as a single cent to the consumers who pay the money, or a pound of bread for their families. If we also consider the fact that all our highest judicial authorities and social economists attribute much more than half of all the pauperism and crime, in the same countries, to the use of those drinks; while the highest authorities in our own profession freely admit that a large percentage of the sickness and mortality is traceable to the same source, we will be compelled to admit that there is no other topic more imperiously demanding the candid, persistent and thorough investigation by every practitioner of the healing art, than that which relates to the real influence of alcohol directly upon the living human system and indirectly upon the collateral interests of the race.

To make such investigations accurately and reliable, the investigator must himself be free from the deceptive and perverting influence of the alcohol upon his own brain and blood. In the language of our excellent Code of Ethics: "It is incumbent upon the faculty to be temperate in all things, for the practice of physic requires the unremitting exercise of a clear and vigorous understanding; and in emergencies, for which no professional man should be unprepared, a steady hand, an acute eye and an unclouded head may be essential to the well being, and even life of a fellow creature." Hence, our by-laws require the practice of total abstinence from alcoholic drinks by the members of this Association, although they place no restrictions upon the conscientious use of alcohol in the treatment of disease. To determine more accurately the origin, nature, physiological effects, and therapeutic uses of alcohol, and to diffuse a knowledge of the same, both in and out of the profession, is the paramount object of our organization. As an Association we have nothing to do with the political parties and questions of the day whether of prohibition, high license, low license, protection, free trade or reciprocity. Our work is one of strict scientific inquiry and investigation. Professor Schmoller, the economist of Germany, says: "Among our working people the conditions of domestic life, of education, of prosperity, of progress, or of degradation, are all dependent on the proportion of income which flows down the father's throat. The whole condition of our lower and middle classes, one may even without exaggeration, say the future of the nation, depends on this question." As the same may be said with equal truth concerning our own people, it certainly becomes us as the professional guardians of the public health, to ascertain more certainly the nature and effects of those drinks that "flow down the father's throat," and which carry with them the income, on which depends the domestic happiness, the education, the prosperity and much of the health of the whole community. It is hardly necessary to say that the one essential ingredient in all the "drinks" here spoken of, whether fermented or distilled, is alcohol. It is not found as a proximate element in living organized bodies, either vegetable or animal, but is exclusively the product of bacteriological action on glucose or saccharine matter, constituting the process known as vinous fermentation. In other words the alcohol is an effete toxic product resulting from the action of the microörganism known as the torula cerevisiæ, of Turpin, on sugar or glucose, and is composed of $C_2 H_6 O$. It is therefore chemically a pure carbo-hydrate, and early in the progress of analytic and organic chemistry, it was unfortunately classed by Baron Liebig with those carbo-hydrates resulting from vegetable growth or nutrition, starch, sugar, gum and cellulose, as supporters of combustion or respiratory food when taken into the human system. Such classification was not founded on the results of any scientific investigations showing that the actual effects of alcohol, starch, sugar, etc., when taken into the living system, were similar, but solely on the fact that they were all composed of the same ultimate elements, carbon, hydrogen and oxygen, in such proportion as to admit of further oxidation outside of the living body.

And as such oxidation or combustion was accompanied by the evolution of heat, it was assumed, without experiment or proof, that all these carbohydrates were oxidated in the living system, and were active supporters of respiration and animal heat, while the various organized animal tissues were developed and nourished from the nitrogenous proximate elements of food. The simplicity of such a classification of foods and animal tissues, aided by the high authority of Liebig, caused it to be universally accepted and thoroughly incorporated into both medical and general literature, where, in the public mind at least, it still remains; and is a fair illustration of the danger or fallacy of assuming that similarity of chemical composition is proof of similarity of action when taken either as drink, food or medicine.

From a somewhat extended investigation of the subject, I think it may be stated as a general law, that all the orders of animal life are dependent for their development, growth and nutrition, upon materials resulting from either vegetable or animal growth. Certainly none of the higher orders of animal life assimilate and appropriate for the growth or repair of their structures and the support of their physiological processes, inorganic materials not previously combined under the formative or vitalizing influence of vegetable or animal life. It may be further stated as an equally general law, that the products of retrograde metabolism or tissue metamorphosis as presented in the excretions and eliminations from living bodies, both vegetable and animal, are not only not capable of being used as food, but are either inert or positively toxic if retained or reintroduced into the living body. Hence we have a clear and most important distinction between such carbohydrates as starch, sugar, gum, cellulose and dextrin, resulting from vegetable and animal nutrition, and the alcohols, which result solely from retrograde metamorphosis or bacteriological excretion, usually termed fermentation. And instead of acting alike as respiratory or indirect food, as has been claimed so long, all the strictly scientific investigations of the last half century have proved their action upon the structures and functions of the living body to be as diverse as their origin. Thus the carbo-hydrates of the first class named, starch, sugar, gum, etc., when taken into the healthy stomach, readily undergo such digestive and assimilative, or molecular changes that their identity is not recognizable in either the blood or tissues of the healthy animal, and the products derived from them produce no unnatural excitement or disturbance in any of the functions and processes of the living body. Though taken in proper quantities daily from year to year, they create no craving or morbid appetite for more; and when the quantity taken at one time is excessive, such excess is rejected with the ordinary fæcal matter of the intestines.

But the alcohols constituting the second class undergo no such digestive or assimilative changes in the stomach or digestive apparatus. If the ordinary ethylic alcohol is taken into the living stomach undiluted and absolutely pure, it acts directly upon the tissues with which it comes in contact as a destructively corrosive poison, and speedily destroys the life of both vegetables and animals when brought in contact with them. When largely diluted with water, as it is in the various fermented and distilled liquors, and taken into the stomach, it is rapidly imbibed, without change, and carried directly into the blood, and with it, into every tissue and organ of the body, as has been demonstrated by the application of reliable tests many hundred times. More or less of it also soon reappears in the excretory secretions and eliminations of the lungs, skin and kidneys, like other foreign or non-assimilable materials. While retained in the blood and in contact with the tissues, the alcohol modifies in a marked degree the sensibility of the nervous structures, and also the molecular or metabolic changes concerned in nutrition, disintegration and sensation. If taken daily for a considerable length of time, it invariably creates a morbid appetite or craving for steadily increasing quantities, and sooner or later establishes degenerative changes in nearly all the organized structures of the body. It is obvious, therefore, that there is actually no similarity or analogy, either histological or physiological, between the carbo-hydrates of vegetable and animal growth and those derived from bacteriological or putrefactive fermentation. And the time has fully come when the purely theoretical, and most mischievous error of grouping them together as respiratory and force generating food, should be corrected in all our literature and eradicated from the public mind. Half or three-quarters of a century since, when alcohol was placed at the head of the list of respiratory foods by the chemico-physiologists of that day, it was claimed that when taken into the living body it readily combined with oxygen, and was resolved into carbon dioxide and water, with the evolution of heat; and hence it came into almost universal use as a supposed stimulant and promotor of animal heat Step by step, however, investigations carefully devised and faithfully executed, have not only demonstrated this supposition to be erroneous, but they have equally demonstrated the real action of alcohol in the living human system to be that of an active anæsthetic, directly diminishing cerebral and nerve sensibility and muscular action; a retarder of the internal respiration, by which oxygen is carried from the pulmonary to the systemic capillaries and a sedative or retarder of the molecular or metabolic changes in the tissues and secreting structures of the body. These several propositions have been so fully sustained by the direct experimental investigations of Prout, Böcker, myself, Richardson, Anstie, Hammond, Harley, Sidney Ringer, Martin, H. C. Wood, Lauder Brunton, Dubois, Reichert and many others, that it would be superfluous to quote them in detail. There are, however, still many, both in and out of the profession, who claim that the alcohol is an anæsthetic only when given in large doses; while if given in smaller doses and repeated at suitable intervals, they claim it acts as a stimulant and tonic especially on the cardiac nerves. The incorrectness of this claim is completely demonstrated by the investigations of Drs. Ringer and Sainsbury, Professors Martin and H. C. Wood.

The experiments of Sidney Ringer and Harrington Sainsbury were instituted for the purpose of determining the relative strength of different alcohols as indicated by their influence on the action of the heart of the frog. In closing their report on the subject they say: "By their direct action on the cardiac tissues these drugs (alcohols) are clearly *paralyzant* and that this appears to be the case from the outset no stage of increased force of contraction preceding."

The experiments of Professor Martin, of John-

Hopkins University, were performed on the dog, and he states the results obtained as follows: "Blood containing ½ per cent. by volume of absolute alcohol has no immediate action on the isolated heart. Blood containing ¼ per cent. by volume, that is, 2½ parts per 1,000 of absolute alcohol, almost invariably remarkably diminishes, within a minute, the work done by the heart; blood containing ½ per cent. always diminishes it, and may even bring the amount pumped out by the left ventricle to so small a quantity, that it is not sufficient to supply the coronary arteries."

Professor H. C. Wood, of the University of Pennsylvania, also executed his experiments on the dog, and in his address to the International Medical Congress at Berlin, 1890, states his results as follows: "An 80 per cent. fluid (alcohol) was used, diluted with water. The amount injected into the jugular vein varied in the different experiments from 5 to 20 cubic centimetres, and in no case have I been able to detect any increase in the size of the pulse, or in the arterial pressure, produced by alcohol, when the heart was failing during advanced chloroform anæsthesia. On the other hand, on several occasions the larger amounts of alcohol apparently greatly increased the rapidity of the fall of the arterial pressure, and aided materially in extinguishing the pulse rate." That alcohol exerted, not only a general anæsthetic effect upon the nervous system, but also a special or direct paralyzing influence on the cardiac and vaso-motor nerves, strictly parallel with that produced by chloroform and ether, was clearly shown by R. Dubois in 1883. And the editor of the department of experimental therapeutics in the fifth volume of the Annual of Universal Medical Sciences, 1892, in referring to the review of the work done by nearly all those who have engaged in experimental investigations regarding the effects of alcohol on the living system, by E. MacDowell Cosgrove, truly says: "Contrary to what has been and is supposed, it is found from all these researches, that small doses of alcohol, from the first, produce a narcotic rather than a stimulating effect." And he adds that all the observers except one, had "also found that alcohol in small doses diminished the amount of carbon dioxide exhaled." It is thus shown, by the direct experimental researches of the most eminent men in different countries, aided by all the instruments of precision invented in this period of active scientific progress, that alcohol in the living system actually diminishes the sensibility and action of nerve structures in direct proportion to the quantity used. An ordinary regard for scientific accuracy, therefore, demands that it should be classed as an anæsthetic or narcotic, and in no sense as a stimulant or tonic. In studying further the mode by which alcohol produces its effects while in the living human system, it is necessary to appreciate the full import of the following propositions:

1. All nerve sensibility and force, and all natural molecular or metabolic changes, nutritive, secretory, and disintegrating, taking place in the living tissues, are absolutely dependent on the presence and movement of blood containing its natural proportion of oxygen.

2. The oxygen needed in the blood is received from the pulmonary air cells by the hemaglobin and serum of the blood and in them conveyed to the systemic capillaries, where it comes in contact with, and exerts its influence on, every cell and structure of the body.

3. Alcohol at ordinary temperatures of the air, or even of that of the living human body, manifests but a very feeble affinity for oxygen, but does manifest a very strong affinity for water, albumen and hemaglobin, acting upon them readily at all ordinary temperatures.

If, therefore, alcohol sufficiently diluted to permit its circulation in the blood, should be introduced, either by the stomach or any other method, instead of uniting with the oxygen, it presents its superior affinity for the hemaglobin and serum albumin, and thereby directly interferes with their reception of more oxygen from the pulmonary air cells. It is thus that the presence of the alcohol hinders the hemaglobin from being converted into oxy-hemaglobin in the pulmonary capillaries, and in the same ratio diminishes the amount of oxygen conveyed to the systemic capillaries; and in the same ratio, also, the nerve sensibility and metabolic changes diminish. This affords a full explanation of the facts now admitted by all who have carefully studied the subject, namely, that the presence of the alcohol retards both nutritive and disintegrative changes, diminishes excretory products and temperature, and lessens nerve sensibility and force.

An explanation of these admitted facts has been hitherto, and still is, sought for on the supposition that the alcohol simply unites with oxygen of the blood and thereby prevents or diminishes the action of the latter on the tissue elements of the body, and yet generates heat and some kind of force. The fatal defect in this old combustion or oxidation theory is, that no investigator has been able to find the legitimate products of such oxidation. So far as is known the oxidation of alcohol resolves it into either aldehyde, carbon dioxide and water, or acetic acid, and evolution of heat. Consequently, if alcohol underwent oxidation in the system some increase of one or all of these products should have been uniformly found, either in the blood, the exhaled air, or in the other excretions. But instead, the most accurate and numerous investigations show less carbon dioxide in the exhaled air, less temperature of the body, and neither acetic acid nor aldehyde in the blood.

And yet the puzzled investigators turn and say that, inasmuch as the alcohol disappears in the system and cannot be all regained from the secretions and eliminations in a limited time, it *must* have been oxidized and converted into some kind of force. But what force? Certainly not nerve force, mental force, muscular force, heat force, or metabolic force; for all of these are directly diminished by its presence. The only force found operative in the case, is the superior affinity of the alcohol for the hemaglobin, albumin, and water of the blood; and its toxic power to so modify their molecular condition and properties as to diminish their efficiency in receiving and conveying the oxygen from the pulmonary to the systemic capillaries, and thereby impairing all the vital processes in which the presence of oxygen is required.

This view also affords a rational explanation of the numerous pathological changes everywhere recognized as resulting from the habitual use of alcoholic drinks, even in the most moderate quantities. These changes were well exposed in the celebrated discussion on chronic alcoholism by the Pathological Society of London, only two years since, and are easily found on the pages of our medical literature.

It enables us also to see clearly the philosophy or

rationale of those illusions and delusions that have been imposed upon the human mind by the use of alcohol in both health and disease through all the generations of the past. Thus, a moderate dose in health by its anæsthetic effect on the nerve cells of the brain lessens the individual's consciousness of cold or heat, of weariness or despondency or weakness, and he is deluded with the idea that it had warmed and cheered and strengthened him, when it had done neither; but instead, had simply diminished the acuteness of his own perceptions while the evils continued in full force. So in the progress of disease, its use generally has the same anæsthetic effect, causing the patient to complain less, rest more, and often say he feels better, but it neither removes the exciting cause, nor corrects the morbid processes constituting the disease, nor increases the activity of the metabolic changes of either nutrition or elimination. Nor is this all. For in the same proportion as the alcohol diminishes the internal distribution of oxygen and thereby acts as a so-called conservator of tissue, it still more actively interferes with the katabolic processes by which the natural excretions are maintained and foreign disturbing elements are eliminated, and consequently it prolongs the morbid processes, favors molecular degenerations, and increases the ratio of mortality. Clinical facts and cases could be cited in abundance, illustrating and sustaining the correctness of the foregoing views, did my time permit. I will, however, at present only add for your consideration the following questions:

1. If the physiological standard of health requires a natural degree of sensibility of the cerebral hemispheres and the internal distribution of oxygen in natural quantity, and the presence of alcohol diminishes both in direct ratio to the quantity taken, how is it possible for persons in health to use it without injury?

2. If the alcohol, while in the living system, does thus diminish the sensibility of the nerve structures and retard the internal distribution of oxygen, is it not a true anæsthetic and organic sedative, and, therefore, adapted to the treatment of only a very limited number of morbid conditions presented in the progress of disease?

3. Is it not true that all the fermented and distilled alcoholic liquors are genuine toxic products of bacteriological cultures, and ought we not to uniformly designate them as such, instead of continuing to delude ourselves, our patients, and the public generally by calling them tonics, stimulants or indirect food?

NEW AXIS-TRACTION OBSTETRIC FORCEPS.

Read before the Section of Obstetrics and Diseases of Women, at the Forty-third Annual Meeting of the American Medical Association, at Detroit, Mich., June 7, 1892.

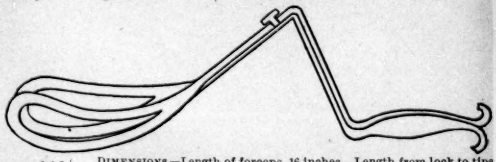
BY WILLIAM B. DEWEES, A.M., M.D., UNIV. OF PA.,
OF SALINA, KAN.

Vice-President of the Pan-American Medical Congress for Kansas, Ex-President of the Golden Belt Medical Society of Kansas, Member Western Association of Obstetricians and Gynecologists, Fellow American Academy of Medicine, etc., etc.

As progressive obstetricians, following Nature's guidance at all times, we are ever directed by the truism, that "real wisdom is always simple."

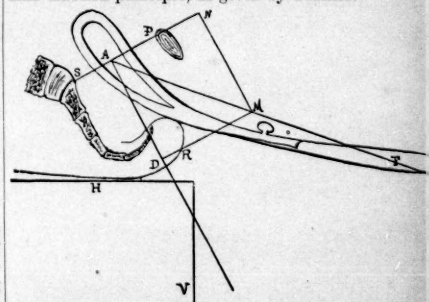
With regard to the use of the obstetric forceps, it may be said truthfully that the principle of axis-traction is conceded by all thoughtful and observing practitioners to be correct. That the day is already dawning when the authorities will hold that no woman should be delivered by instrumental aid, except by axis-traction. But the various ideas advanced for its production are, however, conflicting, and some are even fallacious.

Being convinced, after timely observation and experience, that the desideratum to fulfil the *rationale* of the axis-traction principle was still wanting, I endeavored to supply the same. I succeeded in having Geo. Tiemann & Co., of New York City, make a forceps after my own idealization, which I now have the pleasure of presenting before this august body. The only important new feature is the construction of the perineal curve, and providing the same in the handles which serve for *axis-traction*. It is an aseptic, simple, efficient and economic instrument.



DIMENSIONS.—Length of forceps, 16 inches. Length from lock to tips of blades, 9 inches. Length from lock to perineal curve, 1 inch. Length of perineal curve, 5 inches. Length of axis-traction handles, 5 inches. Average width of blades, 1⅝ inches. Greatest width between blades when closed, 2½ inches. Width between tips of blades when closed, ¾ inch. Weight, 20 ounces.

To demonstrate more clearly that the action of this forceps is in strict accord with the acknowledged axis-traction principle, I beg leave to first call your attention afresh to the classical demonstration of the axis-traction principle, as given by Tarnier.



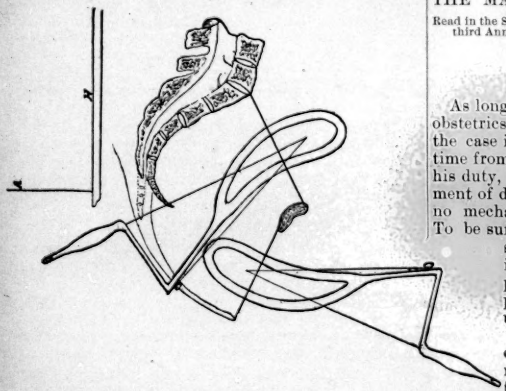
TO ILLUSTRATE AXIS-TRACTION. (Tarnier after Barnes.)
H. V.—Horizontal and Vertical lines of a table. S.—Sacrum. P.—Pubes.

"The figure represents an application of the forceps at the brim. The line A B indicates the axis of the opening which the head must traverse, and therefore the direction the tractions must take to be correct. But when the operator pulls upon the handles of the forceps, the tractions he makes are converted into a force represented by the line A F. Supposing that these tractions equal 40 kilograms, and they be represented by the distance A M, and we construct upon this line A M the parallelogram of forces A D M N, we find that the traction A M is decomposed into two forces—the one, A D, which tends to lower the head in the direction of the axis of the brim; the other, A N, representing a vicious pressure which falls upon the pubes. Now, the lines A M, A D, A N present different lengths, which are expressed by the numbers 40, 30 and 26, in round numbers. Therefore, in pulling upon the handles of the classical forceps with a force of 40 kilograms, one tends to lower the head in the direction A D with a force of 30 kilograms only, whilst involuntarily the pubes is subjected to a vicious pressure of 26 kilograms. It must be understood that in this calculation I have taken into account simply the force and the pressures arising out of the act of the operator, neglecting those which proceed from the natural action of the mother's tissues."

Barnes, in commenting on this, voices the logical conclusion when he says: "He thus demonstrates that it is impossible to pull in the axis of the upper

strait or brim, and to avoid vicious pressure by grasping the handles of the ordinary forceps. Those who object to Tarnier's forceps insist that, by the well-known manœuvre of pulling on the handles with one hand, and at the same time pushing back upon the shanks with the other, the direction of the traction is changed to that of the axis. We are convinced from long practice and many close observations, that the correction thus obtained is inconsiderable, and that Tarnier's demonstration is true. Tarnier next applies a like method of demonstration to the action of the ordinary forceps in the cavity and outlet, showing that in these cases also there is waste of force and vicious pressure."

With your minds thus refreshed, let me now call your attention to the following diagram, which will, I trust, demonstrate to you with sufficient clearness as to convince you that this forceps fulfils, in the simplest manner, the desideratum of an ideal axis-



To Illustrate Axis-Traction with the new Axis-Traction Forceps. *H. V.—Horizontal and Vertical lines of a table.*

traction instrument in strict conformity with the *rationale* of the axis-traction principle.

With the patient placed in the left lateral (English) position, obliquely across the bed, with the nates brought to its verge, and by the use of this forceps, it is claimed:

1. That axis-traction is made perfect, easy and simple.

2. That axis-traction at the superior strait is perfect, and so continues during the entire passage of the fœtal head, following the curve of Carus from the brim to the outlet, with ease and safety.

3. That the axis of the blades of this forceps lies constantly parallel with the axis of the parturient canal as the head descends; thus enabling the accoucheur to fulfil a most important aim in forceps operations, namely: to deliver with a minimum amount of force.

4. That the operator is enabled to seize the head more advantageously at the brim, and the facility with which the head can be aided to descent in the axis of the superior straits, as well as to follow the axis of the pelvis, would seem scarcely possible to one accustomed only to the ordinary forceps.

5. That it is easy of application, and in its triple character—having a moderate head curve, a moderate pelvic curve, and a decided perineal curve (the latter is provided in the handles which serve for traction)—it has all the advantages of axis-traction with plenty of power and perfect control, and with the simplicity of the ordinary forceps.

6. That it does away with the complicated, cumbersome and expensive attachments of the Tarnier and other models. The indicator is constantly in the sentient hands of the operator, who thus at every moment knows, through his *conscience musculaire*, the direction of traction as well as the resistance. Thus preserving intelligent observation of the progress of labor and regulation of the forces employed, which alone can be done by the use of the hands in executing traction and extraction.

THE MANAGEMENT OF LINGERING LABOR.

Read in the Section of Obstetrics and Diseases of Women, at the Forty-third Annual meeting of the American Medical Association, held at Detroit, June, 1892.

BY GEO. C. MOSHER, M.D.,

OF KANSAS CITY, MO.

As long as the physician continues the practice of obstetrics as at present the usual custom, allowing the case in hand to consume the greater part of his time from the hour it is first seen until he finishes his duty, having delivered the patient, the management of delayed or lingering labor where there exists no mechanical obstruction must prove a bugbear. To be sure there are physicians who do not, as they say, "waste their time" in this tedious fashion, but in point of fact the number of practitioners of my acquaintance whose practice is to leave the parturient woman until actually needed is very small indeed.

However anxious he may be to answer other imperative calls, however tired he may be and however so much he may feel that his services are not absolutely required for the time being, still the careful accoucheur does not feel at ease unless within call of his patient.

This being the case it is only natural that many expedients have been resorted to, in order to hasten the desired result. When we shall have reached the Utopian age where we can trust our patient to the care of a conscientious, obedient, intelligent and discreet nurse upon whose judgment we can rely to conduct the case in the interim between the first examination and such time as the physician's skill is ultimately necessary, then this feature of the case will not need be discussed. But this will require an education vastly superior to that now possessed by the average nurse, and also of the patient, and more especially of her friends and over solicitous neighbors, as well.

In the mean time the plain uncomplicated case of lingering labor drags itself wearily along, and what means are best for its management in the interests of the mother, the child and the doctor, the three parties especially concerned? Elaborate treatises have been written upon the more complicated obstetric operations, but this topic which more frequently than abnormal presentation or pelvic deformity or any other surgical feature of obstetric art, is presented for consideration, is, as a rule, but touched lightly

upon in passing from normal labor to that requiring mechanical interference. In no situation is the young obstetrician so uncomfortable as to have assured an anxious family that everything is all right and promised a speedy delivery, then have the pains die out and leave him for hours in a state of uncertainty.

Lingering labor is generally understood to signify a labor where the head presenting normally, the case occupies more than twenty-four hours between commencement and termination, estimating from the beginning of true uterine action. In regard to the effect on the strength of the patient, however, it is not usual that any considerable effort has been made or great exhaustion suffered previous to the rupture of the membranes. Hence in calculating the danger of injury to the soft parts it is sufficient to take into account the time after the escape of the liquor amnii, as the volume of the fluid acting as a cushion renders it impossible for any alarming pressure to be experienced.

Cases related where women have been in labor for ten days or two weeks are not worthy of consideration, being as a rule but exaggeration of the false pains suffered previous to any ordinary labor. In the case of long delayed labor it is ordinarily found that the patient has been debilitated by some previous illness, or if a multipara, the mother of a large family, the uterus fails to act with its accustomed vigor, being in this instance a reversal of the physiological law that muscular energy and tone are increased by exercise. Here the rhythmic character of the contractions is lost and feeble irregular pains are met with, where a roomy pelvis and good dilatation are found and every indication apparent that the powers of nature alone are wanting.

If we remember that in normal labor there is a distinct period of rest between the pains which permits the nervous system to recover itself after the contraction, it can be readily seen that if the pains are constant, without interval of relaxation, the tone of the muscular fibres must be finally exhausted and rigid os likely result as is so often seen in primiparæ where delivery is thus impeded.

From the earliest times efforts have been made to hasten delivery and some of the means are still extant which have become classical in their antiquity. Borax, the virtues of which we frequently hear through midwives and nurses, has had its advocates since the days of the ancients. Cinnamon, fox glove and other similar means, the interest in which at the present day is merely of an historical character, are in the same category as borax. The Asiatics had a favorite plan of treatment, that of tying a piece of tiger's skin over the left thigh of the parturient woman to promote uterine action. Lewis and Clark in their voyage up the Missouri mention the happy result of a dose of twenty grains of powdered rattlesnake tail in the case of an Indian squaw who was a servant in their party and whose labor was unduly prolonged. This same remedy was highly esteemed among African tribes. There is more method in the practice of Mexican Indians who have a tripod prepared under direction of the midwife who is to officiate, according to Engellmann, and from the top of this apparatus a rope dangles; this the patient grasps with her hands and the attendants take turns of encircling her body with their arms and pressing downward until she becomes worn out, then the rope is tied under the arms and the same squeezing process kept up until the patient is delivered or dies, the doctor never lets up until something is accomplished.

Among the Thomsonians, a school of physicians which flourished in the early part of the present century, in our own country, the act of sneezing was invoked to hasten abdominal contractions and some amusing stories have been told of their success and the discomfiture of regular physicians when their practice came in conflict. This plan was called "quilling" and consisted in filling a goose quill with snuff, inserting the quill into the patient's nostril and blowing; often with a sneeze or two the babe was born.

At the present time it is the rule to learn the cause of the delay, to carefully exclude all cases of deformed pelvis, of unusual disparity between the fœtel head and the maternal parts and to look carefully to the rectum and bladder being emptied, before calling the case one of delay, simply, then an effort is made to treat it on physiological principles.

Among the remedies proposed to increase weak pains, and to induce pains where they are failing, warm teas and various drinks are most commonly resorted to among nurses and certainly these can do no harm where they are well retained and perhaps, by brightening up the patient may do good by encouraging her to renewed effort where her courage is failing. At any rate it satisfies her friends that something is being done to relieve her and hasten her delivery. Unless there is great prostration and dangerous weakness, I do not consider stimulants indicated, still a popular reputation that is enjoyed by a cup of warm toddy renders it of such frequent use that it may be allowed occasionally where there is no contra indication. However, the benefit derived is questionable unless the condition of the patient, aside from her labor pains seems to require stimulation.

To the use of ergot previous to the expulsion of the placenta, I am thoroughly opposed. In several cases where its employment was observed the death of the fœtus followed, and after the fœtus has been delivered and ergot used to bring down the placenta, hour glass contractions have been set up, and added to the delay, rather than helping the matter. Where Crédé's method is accurately followed other means are seldom required in delivering the placenta.

To show how much the practice of physicians is to run to fashions, I may quote Mitchell who in 1828 wrote that, "In twenty years the use of ergot becoming thoroughly introduced the forceps would be known only in name and save in rare cases where Cæsarean section was formerly recommended there would be no need for interference in midwifery."

To be sure there are good practitioners who as a regular plan follow the administration of ergot in all cases, freely, and seemingly to me, recklessly, but its dangers and disadvantages of producing clonic contraction, compression of the cord, occasionally rupture of the uterus, etc., are so grave that its use has not seemed justified.

Dr. Beatty in the *Dublin Quarterly Journal of Medical Sciences*, August, 1850, advocated the combination of chloroform and ergot to mitigate the evils of their separate employment, citing numerous cases to prove his position. Quinine as an oxytoxic has been highly praised by Fordyce Barker and in doses of 15 grains of the bisulphate has apparently been of benefit in some cases in which I have used it. Hot water by

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the douche thrown against the unyielding cervix is a valuable aid. The application of hot water cloths, corn meal or bran poultices and similar external stimulants are to be commended, and excitation by slapping the abdomen with a wet towel will occasionally be followed by a good pain. The plan recommended by Zweifel of pressure upon the breech through the abdominal wall, using the left hand and attempting with the right hand, also externally, to aid the head in the direction of the pelvic canal is often of surprising help, aiding the head in rotation and fixation here as in other obstetric operations. Intelligent changing of the patient's posture is often followed by pronounced advance of the fœtal progress.

My rule has been to use chloral in lingering cases where it is not contra-indicated ordinarily, by rectal injection. In some cases its use has so quieted the nerves that a period of repose followed which gave the patient renewed zeal and the happy effect of a speedy termination of the labor. Sometimes an hypodermic injection of morphine is indicated combined with a small dose of atropia, where the nervous system is racked with violent pains which as they say "do not bear right," where a rigid os is found and a history of several hours fruitless suffering. This is most often successful in primiparæ where the pains begin robust and regular but finally fade and become irregular and inefficient.

The use of chloroform is advisable later on in the labor when the head presses firmly on the soft parts and the danger is that the perineum may suffer from the sudden accession of energy liable to come up as the final effort is being made. Earlier it is apt to cause the pains to die away for the time being and in a number of instances that are recalled the use of forceps was demanded because of this condition being induced because the persistent entreaties of the patient for chloroform were complied with. When all other means have been exhausted and the *caput succedaneum* can be distinctly felt, filling up the orifice of the vulva, the parts becoming hot and perhaps swollen; the patient feverish, pulse quickened and the general condition indicates that her force is spent, the final resort is the forceps.

I am well aware that many practitioners do not wait for these conditions to arise but put on the forceps early in the labor, but I want to make a plea for conservative action in this event. Give nature a chance before interfering. The more experience gained the less and less frequently do I find forceps necessary. Many a time mother nature has come to reassert herself when it seemed that instrumental delivery was inevitable. I recall a case some years ago where I had spent the night at a case of lingering labor and at five o'clock in the morning I told the patient that she must be delivered with instruments. I went across the street to ask my friend Dr. Porter for his forceps and found he had left them at his office. Returning to the house to send a messenger for my own case, I was most agreeably surprised to find good labor pains had set in, and before the forceps arrived the case was terminated without mechanical aid. The moral effect on the patient's mind had evidently been sufficient to assist her. This result has so often happened that it has become a habit to speak of instruments to that class of patients that one always thinks, now if she only would try once more she might get through. There are authorities who say "Put on the forceps in all cases where the membranes being ruptured the labor is not terminated in two hours," but there can be no iron clad rule regarding these cases any more than in case of firm membranes to say when we should rupture the sac. Each case being a law unto itself, excepting the general rule that no patient should be allowed to go on to complete exhaustion before energetic means are adopted for her relief.

The interests of the child are as a rule identical with those of the mother and the means proposed to secure her safety happily preserve the offspring as well. In advocating conservatism in using forceps it is only conservatism, not timidity, that is asked. Many lives are saved by intelligent use of forceps where formerly the same class of cases proved fatal to the child and perilous to the mother. The well known case of Princess Charlotte, of England, whose historic and unhappy labor was allowed by her distinguished attendants to drag along from simple inertia of the uterus two days after she should have been delivered offers a striking illustration of the want of such interference. She could have been, beyond question, saved by prompt forceps delivery and this would perhaps have changed an entire dynasty in Great Britain.

In a paper read at the Birmingham meeting of the British Medical Association, 1890, Dr. W. S. Playfair, the distinguished London obstetrician, pointed out some of the means which he considered best adapted to certain phases of labor, and I was much interested in the discussion which was participated in by many of the celebrated men of Britain, and was especially impressed with the thought that the lights of the obstetric world are as much at variance upon those points as would be shown by a comparison of the views of our own confreres.

Dr. T. More Madden, of Dublin, claiming to control the largest obstetric clinic in Great Britain, said his invariable rule was to give ergot in every case of lingering labor, in doses of three to four drachms of watery extract and to fortify this with a hypodermic injection of ergotine. Dr. Murdoch Cameron, of Edinburgh, related how he came to regard opium as a sheet anchor in these cases. He had left with a patient two vials, one containing laudanum, the other fluid extract of ergot and the nurse had given the laudanum at regular intervals instead of the ergot as directed. This, by quieting the nervous system brought on good labor and a case that he had expected to continue for a long time was brought to a close in three hours. Since then it was his plan to carry a bottle of two grain opium pills in his pocket and upon being called to a case of labor, he gave his pills at two hours intervals with the assurance that the case would be soon over or he could go home and get an all night's rest as far as that particular patient was concerned. Others advocated strychnine by hypodermic injection, Barnes' uterine dilators, gelseminum, electricity and a host of novelties in the way of therapeutic aids to delivery.

It is with a good deal of diffidence that I venture to bring this subject before the Section at this time when papers are being presented teeming with erudition and modern methods of procedure. No new theory has been advanced and no especial hobby championed, the greatest good hoped to be accomplished by a general *resumé* of the field is to draw out the opinions of these gentlemen present who may be interested in obstetrics or who may be familiar with its practice.

Dr. Shelton, of Maryland, in discussing the paper of Dr. Mosher, considered that the failure of the woman to bear down in cases of retarded labor is often the cause of the delay, and that this failure is occasioned by the sensitiveness of the parts. To relieve this he applies cocaine and boracic acid locally, or gives chloral and bromides internally.

Dr. C. R. Reed, Middleport, Ohio, said in interfering in delayed labor, much depended on the cause of the delay. He now very rarely waits two or three hours after the os is dilated. He uses the forceps in primipara in three cases out of four, and has not observed that the perineum is ruptured any oftener when the forceps are used than otherwise.

I know I am not borne out by the authorities. I care nothing for that. I know that many cases might have been delivered without the aid of the forceps, but I have never regretted the use of the instruments.

Dr. Sell, New York, related a case of non-rotation of the head in the Vienna Hospital.

Dr. Don, Lewiston, Mich., related two cases where the ammiotic fluid remained to a large extent, and assisted rotation. If the uterus seizes the head tightly and you attempt to rotate the head in the pelvis you may fracture the neck.

Dr. E. G. Zinke related the method of Parry in anointing the hand with oil and pushing the head far up; in many cases the head is then delivered by the action of the uterus on the head in its new position.

Dr. John M. Duff, Pittsburg, distinguished between delayed labor and tardy labor. He agreed with Dr. Davis in recommending the pelvimeter. This would make our young men safer practitioners.

Dr. W. H. Hoy, Battle Creek, Mich., related a case which he had delivered within the last twenty-four hours.

Dr. Mosher, in closing the discussion, said cocaine had been used by him in a hundred cases and he could not see that it did any good. The man who uses the forceps indiscriminately may think he does not rupture the peritoneum, but he does.

Dr. Davis, Philadelphia: One way of expediting labor is a free movement of the bowels by an injection of castor oil, spirits of turpentine and yolks of eggs. Antipyrine, not to exceed 2½ grains per hour, will expedite labor. Greater doses will probably delay labor. In my mind there are only two indications for the use of forceps, viz: those of Schroeder, "positive danger to mother or child." No consideration of time would induce me to use them.

IMPAIRMENT OF THE VOICE, IN FEMALE SINGERS, DUE TO DISEASED SEXUAL ORGANS.

Read in the Section of Obstetrics and Diseases of Women, at the Forty-third Annual Meeting of the American Medical Association, held at Detroit, June 8, 1892.

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This is a subject not treated of, or ever mentioned, in any of our text-books upon the diseases of women, so far as I am acquainted with them. Indeed, the only article I have seen upon the matter was one from Dr. Von Klein, of Dayton, Ohio, and appeared in a copy of THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION of last year. In this article the doctor makes these statements: "The most difficult cases the laryngologist has to treat are the diseases of the throat caused by the disturbance of the ovaries. It is a common thing to meet with cases of acute inflammation of the tonsils, larynx, pharynx and fauces, in females, during the menstrual periods. I have observed the voice of many professional singers, who have applied to me for treatment during the menstrual period, to be defective in gravity, force, and timbre, producing, in many cases, a husky sound as of a low masculine order. In many cases of ovarian disturbance, enlargement and hypertrophy of the tonsils and soft palate are observed, hence the laryngologist can accomplish but little without the assistance of a competent gynecologist."

To better introduce my subject I will now read a letter from a quite noted soubrette who was under my care for some months for uterine trouble, and who had herself noticed a marked failure in her voice, but did not specially attribute it to uterine disease, until I particulurly called her attention to it as the probable reason for her voice failure. Her letter is dated "Dec. 5, 1889," and reads as follows:

"Dr. Leonard: I am now leaving here and have written in a hurry and do not know as I have given you the points you wished, but this one fact is conclusive and that is, the sexual organs not only *go with the voice*, but *control* it. I have been an actress and singer for a number of years, and as my special trouble grew upon me my voice lost purity of tone, and also lessened its range, till, from a high mezzo, I could do only a contralto range. Now that I am nearly recovered I sing with greater ease and have regained purity of tone, whilst in the upper register of voice *I have gained two full tones*, and am firmly convinced that I should have lost my singing voice entirely had I not have had the special treatment by you. My improvement has been so great that the singing professor, under whom I have been training, not knowing I was under special treatment, has taken to himself the full credit for my increased power and range of voice. Sincerely yours, etc."

Some two years after this, or during the past fall, the actress being in the city, she called upon me and reiterated what she had witten me in 1889, saying that she had permanently retained the two upper notes that she had gained during my treatment, and that there had been no relapse of the special troubles for which she had been treated by me. She also gave the history of a friend of hers, another professional singer, that had a similar experience to her own.

Now, while I do not think an increase of two notes in the vocal scale, from the treatment of a singer's sexual organs, is an occurrence to be expected in the majority of instances where a soprano may need a gynecologist's attention, still, I am satisfied that the popular notion that obtains with them—a huskiness of the voice at the time of the periods, is well founded; and I am sure my experience with several other cases would warrant me in asserting that the tone, pitch and range of voice of female singers is seriously encroached upon whenever they have *any* disease of gravity affecting their sexual organs.

It will be noted that Dr. Von Klein laid the greater stress upon the ovarian troubles: in the case of mine just reported, as well as in several other cases that have been under my care, the ovaries were not specially diseased; indeed, the ovarian symptoms were the least prominent, the main ones being uterine. In the case reported of the soubrette there was anteflexion and narrowing of the uterine canal, with severe endometritis. These trouble were treated and no attention paid to the ovaries, their recovery taking place without this. Of course, the two organs, uterus and ovary, are so intimately connected arterially and nervously, that a severe uterine inflammation may set up an irritation in the ovary; this I do not attempt to deny: but, curing the uterine trouble, the ovarian is cured as well. What I would specially wish to emphasize then, in contra-distinction to the claim set up in Dr. Von Klein's paper, is that to the uterus, more than to the ovary, we must look for the cause of imperfect voice in many of our female singers.

When we consider the intimate connection of the uterus with the great sympathetic nervous system, and the frequent deleterious impression of the stomach, heart and head reflexly therefrom by the way of this nervous connection, it is but carrying the same reflex process but one step farther when we assert its

reflex influence over the organs of the voice. If good singers have themselves noticed this, at their regular monthly periods, and so have abstained as much as possible from the critical exercise of their voice at these regularly recurring periods, and many have so told me that they have noticed the prejudicial influence of these periods over their voices, then it stands to reason that an inflamed or conjested uterus will, at other times, also prejudiciously affect the organs of voice and song.

In tracing out the chain of nervous connections between the uterus and the larynx we find that, according to Bernard and Bischoff, if the spinal accessory nerve be cut or torn away, all the other cranial nerves remaining intact, there will be complete loss of voice. The same phenomena are observed if the inferior laryngeal be destroyed.

The motor fibres of the pneumogastric, so far as the formation of the voice is concerned, are derived from the spinal accessory: the pneumogastric is specially brought under control of the uterus from its connection with the solar plexus that so freely supplies the heart and stomach. An inhibition of the spinal accessory could, physiologically, occur by a perverted nerve influence set up at the uterine or inferior hypogastric plexus; this influence would be transmitted directly to the solar plexus and reflexly therefrom to the spinal cord, heart and stomach, and then through the pneumogastric to the spinal accessory, recurrent laryngeal and glosso-pharyngeal, thus paralyzing, in a measure, the motor influence of all these nerves over the muscles of phonation.

The muscles governing pitch of voice are the crico-thyroid and the thyro-arytenoid—the muscles of tension of the vocal cords. These cords vibrate from 572 times (the gravest note) to 1, 606 times (the highest note) each second of time, in our soprano singers. You can readily see, then, that the slightest impairment of the normal innervation must necessarily render organs so extremely delicate as these cords are deficient in their higher tensions and consequently imperfect in their range and action; huskiness, from the less tension of the vocal cords, would be one of the first symptoms of deficient nerve influence, a loss of a tone or so the natural result of a greater impairment of its nervous tonicity.

When you now combine these immensely frequent vibrations of the vocal cords, in the female, with the other muscle combinations taking place in the phenomena that we term phonation, remembering that there are something over one billion of these combinations with the other laryngeal muscles (for Bishop avers that for every modulation of the human voice there are, at least, 100 muscles that must be brought into perfect coördination), we have the grand total of 20,000,000,000,000 of muscular combinations in phonation; when this is properly considered, I say, the only wonder is then, not at an occasional lapse of coördination or the loss of a tone, but that even in the most perfect health and training such exactness of the scale as seen in the vocal accomplishments of our singers can ever be obtained.

That there is this intimate connection between the nerves of the uterus and those of the larynx, as above claimed, I am positive of, for I have time and again witnessed their reflex action on several of my patients. One of the most distressing exhibitions of laryngeal spasm I ever saw was in the person of Mrs. S., 40 years of age, and suffering from a large uterine fibroid. She had this reflex laryngeal spasm to that extent that suffocation was imminent at each application of anything to the endometrium. I, as well as the patient, dreaded each bi-weekly visit, as she would strangle until she became black in the face, and lose consciousness, at times, at each application; any point of the uterine canal seemed equally sensitive whether probe, sound or medicament was used. As the uterine irritation was progressing towards cure she had these spasms less violently; but the immediate and direct connection of the uterine nerves with those of the larynx was conclusively shown, dozens of times, to the students that were with me at my clinics whenever this patient would call.

I have under treatment, at the present time, a private patient that manifests these laryngeal spasms at each intra-uterine application, though to a much less degree of severity than the case just detailed. Still another private patient, though having no spasm, has a marked laryngeal pain at each application, and during the times of treatment complains of great pain in the larynx; indeed, the most of her pain is referred to this organ rather than to the uterus, though there is no laryngeal difficulty, but a marked endometritis. These cases of laryngeal spasm and pain were and are not the minor laryngeal difficulty known as "globus hystericus," a disease affecting reflexly the vocal organs and throat and which was well-known in the time of Hippocrates.

A further case of prejudicious influence over the voice from the reflex action of the pelvic organs, though seen in the male, is detailed by Dr. Sivers, of Ft. Wayne, Ind., in a recent number of the *Medical Age*. The doctor's case was one of chronic laryngitis where the patient could not speak above a whisper for two years and where the exciting cause of the trouble was found to be pile tumors in the rectum; proper treatment being addressed to them the difficulty of voice was permanently relieved. The nerve fibres in the male pelvis are analogous and similar to those in the female, hence the results obtained in Dr. Siver's case but confirm the position taken in the claims I have made of the influence of the pelvic organs over the voice; a further analogue is seen in the modification of the voice in soprano male singers who have been submitted to castration.

PERITONEAL IRRIGATION AND DRAINAGE.

Read in the Obstetrical Section at the Forty-third Annual Meeting of the American Medical Association, held at Detroit, Mich., June 7, 1892.

BY A. H. CORDIER, M.D.,
OF KANSAS CITY, MO.

If an apology for presenting a paper before this great body of learned men, is necessary, my excuse is, the diversity of opinion among surgeons, and in some instances ignorance, of when and how to use intraperitoneal irrigation and drainage. You will find one surgeon using neither, another resorts to drainage alone in some of the many ways of using, another uses both according to his ideas, which of course he is entitled to follow, provided he gets the good results from his method of using these agents that are obtained by other surgeons perhaps by a different method.

The latest works on abdominal and pelvic surgery contain, like the older books, very short and misleading articles on the indications for peritoneal

irrigation and drainage, and still less explicit are the directions how to use these agents for good intelligently and correctly. This diversity of opinion among revolving book rack authors leaves the inexperienced beginner in a position of perplexity and doubt as to the special course he is to pursue in his early work. No one should undertake to irrigate or drain a peritoneal cavity before he has witnessed and assisted a master of this special branch in our healing art in a large series of cases, and has mastered his teacher's technique.

If you hear an operator condemning drainage, and on examining his mortality column, find a death rate of 8 to 12 per cent. in a series of cases and a number in this list under heading of "cause of death unknown," "peritonitis," "heart failure," "hæmorrhage," you may rest assured that some deaths could have been averted by the irrigator and tube. "People seldom improve when they have no model but themselves to copy after." To illustrate this diversity of opinion among gynecological and surgical writers, I will with your kind indulgence, quote from a few of the standard textbooks. One author condemns drainage and on same page tells how he uses it: "A rubber tube perforated for three inches of its abdominal end and long enough to run out over the edge of the bed into a basin filled with carbolized water to prevent the entrance of germs." The same writer speaks of secondary drainage to remove putrid discharges collected in the pelvis to prevent septic symptoms, and adds: "Of course no one would think of performing this operation until septic fever is evident."

Another writer says: "If a drainage tube has been used it should be well *corked* (italics mine) until symptoms of blood poisoning arise when it is to be opened frequently to admit of the escape of any fluid that may be in the cavity * * * and a hard rubber syringe passed to the bottom of the tube to remove what has not run out."

A noted German operator and author writes: "After a vaginal and supra-vaginal hysterectomy, I continue to use drainage of the pouch of Douglas after this operation in spite of various publications which state that the omission of this is not injurious. I attribute my success essentially to this treatment in connection with two observations which I have made. One case perished from septic peritonitis in which the tube was allowed to escape and a collection of secretions formed at the bottom of Douglas pouch. The second case I was induced by the publication of successful cases without drainage to omit the latter which I otherwise employed. The patient recovered well from the shock of the operation; in the course of the second day, however, an extremely threatening collapse occurred with pallor of countenance and increased frequency of pulse. The symptoms disappeared at once as I had the patient sit up, and separated the sides of the opening in the vault of the vagina by passing my fingers into it; a large amount of sticky and foul fluid was discharged. From this moment the patient got better." He says on the indication when to remove the drainage tube: "usually between the third and fourth day a peculiar period of drawing is experienced in the umbilical region; I then remove the tube. Since I have employed this method of treatment the results of supra-vaginal amputation have become essentially better and surer." This great operator lets this lesson from nature in drainage teach him nothing. In 77 salpingectomies this same operator had 14 deaths, with no history of drainage. Of this number 10 died of sepsis or the result may be traced to this source as a cause.

One aspirant to operative fame, when discussing drainage with a professional brother, said: "I do not see how you can drain the pelvis with the tube standing straight up." His wise senior replied: "Turn the patient on her side and let it run out."

I have seen a drainage tube pushed down into the pelvis and the dressings and bandage applied over its outer extremity, and that too by a teacher before his class, at same time remarking that he had had a number of fecal fistulæ following the use of the tube and that it was very troublesome to keep the dressings clean and dry.

Hydrostatic pressure on the diaphragm has been advanced as a counter-indication to the use of the irrigator. An outward flow during your irrigation is obtained if used properly; you rarely wash the diaphragm unless you have been using the Trendelenburg position and had your patient's diaphragm and liver flushed with pus or other septic fluids during the operation. You do not use water hot enough to paralyze the solar plexus as some apprehend.

The general surgeon long since called attention to the fact that old abscesses with a limiting wall if disturbed, in many cases lead to systemic infection by changing the character of this breastwork to one with absorbing functions. While this fact was long since recognized, it was not suspected that the changes wrought in the surrounding tissues by surgical interference lead to a secondary infection by the admission of new agents into the abscess cavity, yet every effort was made to keep an outward flow of the discharges by drainage, through counter openings, vapor baths, cathartics, diuretics, etc., etc., all drainage agents.

If we accept or reject the germ theory of the suppurative process and its prevention by *antiseptic* or *aseptic* methods the truth remains unaffected that it has been through this channel of purification that we have learned that cleanliness in surgery is next to godliness. If germicides are or are not used while operating the deluent acts as an absolvent to the dirt or as a destructive agent to the pathogenic bacteria, and the same end is obtained provided both methods are carried out with equal care and diligence, although possibly by a different process. One by washing away the dirt or germs present, the other by destroying or inhibiting those not destroyed.

The object in either method is to reduce to a minimum the amount of chemical substances or number of germs so that the functions of absorption, destruction, and elimination are not overtaxed, at the same time reducing to the lowest ebb the fermentative fever tendency, by removing at the time of the operation as much of the fever producing agent as possible by irrigation and keeping the locality clean by thorough drainage afterwards. There are localities in the body where germicides cannot be used in strengths sufficient to have the action desired without producing toxic effects. Fortunately, it is in this same locality that we have the greatest absorptive and eliminative function developed.

In peritoneal surgery irrigation and drainage are positively indicated and indispensable in the majority of cases. The same principles hold good in draining

the peritoneal cavity that are applicable to other parts of the body. No surgeon, with all the antiseptic precautions possible to be used in opening a diffused abscess of the thigh or other parts of the body would think of such a thing as at once closing the wound hermetically, leaving many broken down shreds of diseased tissue dangling in the abscess cavity. He may have irrigated the cavity thoroughly with a "1 to 1,000," yet he would not feel it safe to close the wound until after he had made counter openings and introduced drainage tubes. This being as near ideal surgery as it is possible to obtain in these cases. The presence of the tube does not have special healing virtues only in as far as they keep the parts free from the poisonous discharges, permit the structures to come in contact and heal in their normal relations and at the same time by this system of drainage avoid the absorption of septic and putrid material.

It is a fact long since recognized that aseptic blood clots may become organized, if not absorbed, and give rise to firm and dense adhesions. If any pus forming agents are introduced during the operation, or even those already present in limited numbers, the presence of much blood in the peritoneal cavity prevents to some extent the absorption of these pathogenic bacteria and their destruction by the phagocytes, and thus being allowed to remain, rapidly multiply in this fertilized hot-bed, paralyzing this function of the white cells by the overwhelming numbers, attacks the peritoneum, producing a rapidly fatal peritonitis in the majority of instances. If this truth is accepted no conscientious surgeon should fail to irrigate and drain after operations for the removal of pus tubes, dermoids, etc., etc., or where there was much effused blood during or following an intra-peritoneal operation. A peritoneum cannot absorb liquids as long as it is, so to speak, "water-logged" or œdematous. Any method or treatment, whether by drainage or by hydragogues have the same object in view, that is the removal of the effused liquid or its elimination by hastening its absorption. In "hulling" out adherent pus tubes, dermoids, breaking up adhesions, many surfaces are of necessity left denuded of peritoneum. These surfaces have very poor absorptive powers, yet they pour out much fluid which, if not removed early, is liable to become putrid or septic. It is a well recognized fact that a traumatism produced by aseptic agents leading to plastic inflammation is localized to the seat of the injury and does not spread much beyond this location as long as the surroundings are kept aseptic. Also that the germ producing powers of a once begun septic peritonitis are unlimited and the bacterial hot bed being located within the cavity affected, accounts for its wide spread. With this truth before us we should in every case do all operations, if not antiseptically, aseptically, and to insure the maintenance of this clean condition, endeavor to keep the cavity as clean as possible after the operation by not only draining the non-decomposed secretions and thus reducing the severity of the aseptic fever to the lowest ebb, but at the same time reducing to a minimum the number of pathogenic germs accidentally or unavoidably introduced during the performance of the operation, and thereby thwart an attack of acute peritonitis. In cases operated on where there existed at the time of the operation a free dropsical fluid, a drainage tube must be introduced, as the peritoneum cannot absorb anything when in this condition, and by keeping it dry a few days the effusion in many cases ceases to re-accumulate unless the presence of the fluid be due to malignant disease of the peritoneum or other abdominal of pelvic viscera. In old and debilitated patients the absorptive powers of the peritoneum are lessened and in these cases we find an indication for drainage. Operations involving structures in a state of inflammation are always followed by a profuse flow of serum, which is more liable to become purulent or septic than if performed in healthy structures. You have less pain in the cases that are drained as the pain from pressure on the nerves caused by the effused liquid is removed with the liquid. Fluid is liable to undergo decomposition from contamination through the intestinal walls. The accumulation of fluid in the pelvis must be prevented, if possible, after all operations.

The above language as a short plea for drainage is equally as applicable to the use of hot water irrigations in abdominal and pelvic surgery, for where drainage is indicated irrigation is demanded. Many surgeons decry the use of the tube by stating that they do not see any cases in which it is needed.

Irrigation.—Freshly boiled, distilled water cooled to 102° F. to 110° F., should be used in irrigating. After the performance of the operation and before the stitches have been introduced, the cavity should be thoroughly washed by means of the irrigator.

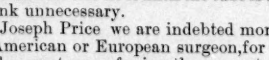
The irrigator consists of a rubber tube three feet long and three quarters of an inch in diameter, to one end of which is attached a funnel, to the other a hard rubber nozzle about ten inches long with side perforations, the distal end being closed except a small opening in the center. The patient is turned on her side toward the operator, who with two fingers of the left hand introduced near the lower angle of abdominal incision and slightly separated, the nozzle of the irrigator is introduced (having first started the water to running) into the inferior angle, is guided by the fingers to the lowest recess of the pelvis and moved about from one locality to another while the water is being poured into the funnel from a pitcher held in readiness, to be used for this purpose only.

Just before beginning the irrigation the anæsthetic should be pushed to profound anæsthesia; if this precaution is not observed, the patient will resist your efforts and cause the intestines to protrude through the incision and cause unnecessary delay in replacing them and keeping them replaced. This is an illustration of the stimulating and reviving effect of the hot water. While thus using the water it is surprising to see with what rapidity and force the large blood clots and other foreign bodies present are forced from the cavity. During the flow of the water the operator should gently move the viscera around that the fluid may come in contact with every nook and corner. As long as the water comes away blood

stained, especially after using considerable hot water you may know that some hæmorrhage is going on, except in extra-uterine pregnancy with rupture or where you find much free blood and soft clots; here the water will continue to return blood stained as long as you use it and will lead the inexperienced operator to think that an alarming hæmorrhage is going on and cause him to seek the source of the bleeding. The blood stained fluid returning through the incision is much darker in this condition than if a hæmorrhage is actually going on during your irrigation. The operator should always test the temperature of the water by introducing his hand into each pitcherful as it is being raised to the height of the funnel, which is held by his assistant. The irrigator should always be started running before introducing the nozzle. In some cases it will be necessary to use much more water than in others, as in cases of ectopic gestation with rupture in which a large quantity of blood is found, or in ruptured pus tubes or profuse hæmorrhage from broken down adhesions, etc., etc. Its hæmostatic effects are often quickly noticed, much to the satisfaction of the operator, where there is an alarming hæmorrhage from torn vessels or a general oozing. Its beneficial effects are also perceptible in many cases in preventing shock or causing the patient to rally from this condition, if it exist. If your operative technique has been good and your surgery not too "chronic," your irrigation satisfactory and your drainage tube *properly introduced* you may expect recovery in a larger per cent. of these cases than you could expect without these agents.

In addition to the cases mentioned irrigation should be used in all cases of intestinal and bladder injuries where there is a perforation and extravasation, also in appendicitis, surgical operations on the gall-bladder and kidneys where there is an escape of bile, urine or pus. In using the irrigator avoid too rough handling of the nozzle lest you disturbed your pedicle ligatures and start up an alarming hæmorrhage. After thoroughly flushing the cavity the residual fluid is removed by soft clean sponges. A small quantity of the clear fluid left can do no harm, in fact in some cases, as in ruptured tubal pregnancy, it is absolutely impossible to leave the peritoneal cavity free from clots and fluid. In this condition water is left on purpose that it may aid in liquefying the soft clots entangled in the folds of the omentum and mesentery, that the liquefied product may be removed by aspiration through the drainage tube and the work of digestion and absorption by the peritoneum lessened and hastened. Having completed your irrigation and introduced your *silk worm gut* sutures, before tying them you introduce the drainage tube, which should be used with rare exceptions, where in your opinion it has been necessary to use irrigation. Some operators introduce an extra stitch at the site of the tube and do not tie it until the tube is removed; this I think unnecessary.

To Dr. Joseph Price we are indebted more than to any one American or European surgeon, for the intelligent and correct way of using these agents.



The tube is a straight glass one of lengths and sizes to suit individual cases, as one tube cannot be adjusted to accurately fit all cases. The lengths varying from three inches, for children, to nine inches to meet the requirements in very fat subjects with greatly thickened abdominal walls and a pelvis of great depth. The average length however is about six inches. I have not seen a *good* tube whose diameter was over five-eighths of an inch or less than one quarter. The tubes are straight, the end introduced has an open mouth, that large pieces of detached shreds of adhesions or blood clots may be removed by aspiration; many small round perforations mark the sides of the tube for the first inch and a half. The distal end is flanged (not down on the side an inch as I have seen in many tubes) the same as you see in the commonest tube. This projection retains the sheet of rubber dam, at the same time prevents the tube escaping into the abdominal cavity, not a very likely accident if the tube is a properly selected one and introduced in the right way. Having selected your tube, which by the way must be done before hand, that it may have been properly prepared before you are ready to use it, you introduce it precisely as was directed for the introduction of the nozzle of the irrigator into the pelvis or the region to be drained. While your assistant steadies the tube and thus retains it where you intend it should remain, you tie your sutures and accurately adjust the divided structures making the tissues closely fit the circumference of the tube. After removing the fluid collected in the tube at this time by means of a long

nozzled piston syringe and satisfying yourself that everything is all right you take a piece of rubber dam fifteen inches square with a small niche in its center, by stretching this little opening you are enabled to slip it over the flange of the tube and being released contracts so accurately fitting the tube as to make it impervious, and thus avoid soiling the dressing by the escaping drainage, should it, by carelessness or from inattention on the part of the nurse, be permitted to overflow. Again removing any fluid collected, you cover the opening in the tube with absorbent cotton and neatly folding the four corners of the rubber dam over this, entrust it to the care of your assistant while the many tailed abdominal binder is being adjusted.

One corner of the folded dam is secured to the binder with a safety pin and after emptying the tube again your patient is put to bed surrounded by the usual precautions. Of course gauze is placed over the wound, around the tube, by splitting each layer and over this the binder is placed.

The nurse is instructed when and how to cleanse the tube. By this arrangement of the dressings the tube can be pumped out as often as it fills without in the least disturbing the patient by the removal of the dressings.

Every aseptic precaution should be observed in the emptying of the tube. The hands of the nurse or the physician should be clean, the syringe should be scalded each time before introducing it, the mouth of the tube must be cleansed by a pledget of absorbent cotton before the syringe is used. While cleansing the tube with the syringe if the piston fails to slip easily you may know that a blood clot or shred of some adhesions have become engaged and by withdrawing the nozzle you may, and often will suc-

ceed in removing the foreign body. After drying the tube a fresh supply of absorbent cotton is placed over its mouth and the corners of the rubber dam neatly folded over it and pinned. This same precaution should be observed at each cleansing of the tube. The tube should be rotated and raised a quarter of an inch two or three times for the first twenty-four hours. This relieves pressure on the intestines, if any exist and at same time prevents the omentum becoming entangled in the holes of the tube, an accident more of an anticipated dread than of actual occurrence. After removing the glass tube if there is any fluid likely to collect within the next twenty-four hours, a small rubber tube may be left in the site of the glass tube by introducing it through the glass tube before it is removed. This in turn can usually be removed on the following day.

By using drainage as I have described, the bandages and dressings are kept dry and clean, do not have to be disturbed until the time arrives to remove the tube or stitches. When the tube fails to show much over a drachm of fluid, collected in an hour or two, the time has arrived to remove it, unless this small amount of fluid is purulent or offensive. Ordinarily the tube can be removed with safety on the second or third day. The opening soon closes and there is no more danger of a ventral hernia following than if drainage had not been used.

Drs. Price and Wylie years ago called attention to the fact that many deaths from so-called shock were in reality deaths from concealed fatal hæmorrhages and advocated the introduction of the tube in these cases in which there was free oozing during or following an operation. The presence of the tube, by keeping the peritoneal cavity free from lymph is a direct and most efficient hæmostatic. This fluid normally present in small amount is greatly augmented by the manipulation of the peritoneum during the performance of an abdominal section, and like the moist fomentations over the scarrified surface of any other part of the body, promotes bleeding and prevents the formation of firm clots in the mouths of the small blood vessels torn across while breaking down adhesions.

Gentlemen, if you will use "Peritoneal Irrigation and Drainage" as I have described it, you will not, I am sure, condemn the method. They will help reduce your mortality, I am sure.

1016 East 9th Street.

DRAINAGE IN ABDOMINAL SURGERY.

Read in the Section of Obstetrics and Diseases of Women, at the Forty-third Annual Meeting of the American Medical Association, held at Detroit, Mich., June, 1892.

BY DONNEL HUGHES, M.D.,
OF PHILADELPHIA, PA.

Drainage of the peritoneal cavity is one of the most important subjects connected with abdominal surgery, and yet at the same time, it is one of the most disputed points. The difference of opinion that exists to so marked a degree is due, no doubt, to the fear that the tube may act as a source of septic infection, or by its use the abdominal walls are weakened to such an extent as to favor the development of ventral hernia or the formation of a fistulous tract. It is an accepted fact, that the object of drainage is to remove all those deleterious substances which, if allowed to remain within the peritoneal cavity or any other cavity within the body, would in a greater or lesser degree retard the progress of the case toward recovery, and in many instances endanger, if not sacrifice the life of the patient. I do not believe that it is necessary, or even advisable, to use drainage in every case of abdominal section. If aseptic conditions are scrupulously maintained throughout the operation, and all bleeding vessels secured, the abdominal cavity thoroughly irrigated with pure distilled water (that is warmed and has previously been thoroughly boiled), whenever any blood or foreign substance has escaped into it—under these circumstances drainage is not necessary; and if not necessary, it is certainly not advisable. It should not be lost sight of for one moment that the drainage tube is at best, a foreign body, and capable of causing a good deal of irritation, and in many cases, if great care is not exercised, it is a fruitful source for the entrance of septic matter. Cases very frequently present themselves in which it is absolutely demanded for the safety of the patient. The cases in which it should be used are very numerous. I will mention the cases in which its use is necessary: 1. When pus or any other septic material has entered the peritoneal cavity before or during the operation. 2. When extensive adhesions have been severed, and there is an oozing surface. 3. When hæmorrhage is feared, or when present and cannot be controlled. 4. Where there is malignant disease and danger of subsequent infection. 5. In cases where simple or tubercular peritonitis exists, or where there is a large accumulation of ascitic fluid. When it is deemed advisable to use drainage, the question then arises, what device should be employed for that purpose? It should be answered in the following way: If there is hæmorrhage that cannot be controlled by the application of ligatures or hæmostatic forceps, or by some of the many methods that we have at our command, the best plan is to pack the bleeding cavity with a strip of iodoform gauze and bring the end of it out at the lower angle of the wound. We then have tampon and drainage combined. At the expiration of forty-eight hours the gauze should be removed. If the bleeding has ceased and there is need for drainage, a small rubber or glass tube may be substituted for the gauze; if there is still a tendency to hæmorrhage, the gauze may be reintroduced and allowed to remain a few days longer. In cases where there is oozing that has been caused by the breaking of adhesions, or when pus has escaped into the peritoneal cavity, or when the large bowel has been ruptured, and the rent cannot be found, a glass tube open at both ends, and perforated on its sides with small round holes, should be used. The tube should be long enough to reach from the lower angle of the wound to the bottom of Douglas' pouch. The circumference of the tube should be determined by the quantity and consistency of the material that it is expected to convey out of the cavity; the smallest tube should be selected that will properly carry the fluid. Care should be taken when the tube is introduced that it does not press upon a loop of intestine instead of upon the floor of the pelvis. Before inserting the tube a suture should be introduced and left unfastened, its object being to close the opening that remains after the removal of the drainage tube, otherwise a weak cicatrix might remain, that would favor the formation of ventral hernia. After the tube is in its proper position, and the abdominal wound closed and the usual antiseptic dressings ap-

plied, a piece of rubber sheeting about one foot square, with a small hole in the centre of it, should be sprung over the tube in order to prevent the discharge soiling the dressings and infecting the wound. Aseptic absorbent cotton should then be placed over the opening in the tube to absorb the overflow, and over this the rubber sheeting is folded and retained in position with a safety pin. The most important point to be observed in the use of the drainage tube is frequent and thorough cleansing. No regular or fixed time can be set for emptying the tube, but a good rule should be to clean it whenever it is filled with fluid, no matter how short the interval. The fluid is best removed with a long nozzle uterine syringe, or a piece of rubber tubing attached to an ordinary syringe. When hæmorrhage is indicated by the flow of pure blood from the tube, the blood must be constantly removed, as by keeping the bleeding surface dry coagulation is promoted, and the hæmorrhage very often arrested. After the drainage tube has been in use for forty-eight hours, it becomes surrounded by the tissues, which are retained in that position by adhesive inflammation, therefore after that time, it is of very little if any use in draining the abdominal cavity. It will, however, drain the pelvis for a much longer time. The tube should be raised two or three inches out of the wound every day and turned completely around on its axis, and allowed to drop by its own weight, in order to prevent prolonged pressure on any one point, and also to prevent the organizing exudation from penetrating the lateral openings in the tube. The drainage tube should be allowed to remain until the discharge is reduced to 2 or 3 drachms of clear serum a day, this usually occurs within three days. After it has been removed, the free ends of the suture that was left for the closure of the drainage tube wound should be tied.

NON-MALIGNANT, NON-TUBERCULAR, NON-HYDATID CYSTIC DISEASE OF THE PERITONEUM.

Read by invitation in the Section of Obstetrics and Diseases of Women, at the Forty-third Annual Meeting of the American Medical Association, held at Detroit, Mich., June, 1892.

BY JAMES F. W. ROSS, M.D.,
OF TORONTO, ONT.

The subject selected is not likely to prove of interest to the general practitioner; it is not likely to open up any practical discussion, but it is of interest to the abdominal surgeon. The disease to be discussed is allied with acute peritonitis on the one hand and intermittent pelvic peritonitis on the other. The disease is cystic and yet inflammatory. It is therefore essential that we should consider the pathology of cysts and the pathology of peritonitis. Authors vary in their classification of cysts, and yet agree in the main distinctive features of these interesting aberrations from a normal condition. For our present purpose we need but remember that we have epithelial cysts and endothelial cysts. Epithelial cysts are cysts of retention. Endothelial cysts are formed of the dilatation of cavities in connective tissue such as bursæ, tendon sheaths and obstructed lymph channels (Zeigler). An inflamed bursa, from the inability of the serous lining to absorb the fluid poured into its interior, becomes a cyst, and if we would carry the analogy to what might be considered too great a length, the inflamed peritoneum, from the inability of its serous lining to absorb the fluid poured into it, becomes a cyst. Newly formed or false membrane may surround fluid so that portions of the fluid become collected in sacs, and thus inflammatory cysts are formed. Pus is surrounded in this way in the abdomen, and pockets of encysted pus are shut off from the general peritoneum. The very same formation of pockets of encysted serum takes place subsequent to a peritonitis.

We have other cysts, such as the cysts of disintegration, and the cysts formed around foreign bodies, such as hydatids and blood cysts, but with these we have nothing to do at present. But I wish to mention the cysts that are found filled with lymph instead of serum, from the obstruction of the lymph channels; with blood instead of serum, from the intracystic rupture of one of the newly formed and delicate vessels; with air instead of serum, a condition that has been noticed by several good observers. The latter condition is a pathological curiosity. One case in which this condition was found has been well recorded in the London Pathological Society's Transactions, Vol. xxii. The patient suffered from a duodenal ulcer, and the supposition was that flatus escaped beneath the peritoneum and produced the condition. The cysts were like the cystic dilatations so frequently found hanging from the fimbriated extremity of a *normal* Fallopian tube, or from the tubules of Kobelt in a *normal* broad ligament. Some were as large as a hazel nut. They hung by a single pedicle. Some similar ones contained coagulated blood instead of air, but even in these, hollow spaces were found on section. The parietal as well as the visceral peritoneum was affected. In his discourse on the case I find the following, written by the author of the paper: "Were the cysts which contained the air of independent formation, or were they produced in any way by the emphysematous bubbles? Against the first view it must be urged that cysts of the peritoneum are hardly known; nothing of the kind is mentioned in the standard text-books." In the latter sentence you have my excuse for presenting to you such a subject. That I should thus early in my lifetime have met with two cases would seem to indicate that the disease is not of such rare occurrence. My friend, Dr. C. A. L. Reed, has promised to put two cases on record and to give his views regarding the etiology and treatment of the disease. We will return to the pathology after detailing the cases. My own cases were as follows:

Case 1.—Mrs. A. L. æt. 22, had evidently suffered from gonorrhœa two and a half years before she came under my observation. The history was that of intermittent pelvic peritonitis. When making a vaginal examination, I felt what I concluded was a urine-filled bladder, and asked her physician, Dr. Dawson, why she kept her bladder so full when she knew we required bladder and rectum empty. She was at the time under the influence of an anæsthetic, so that I passed a catheter myself. No water came, and yet I felt sure that the fluid must be in the bladder. The wall surrounding the fluid was lax and not tense like the wall of an ovarian cyst. I then felt two pus tubes, one on each side of the uterus, and advised their removal. The collection of fluid was a mystery I was unable to solve.

On opening the abdomen three days after (namely, on November 4, 1891), I found peritoneal cysts looking like white grapes. Owing to the matting of bowel and omentum to some mass, I put the patient in Trendelenberg's position to facilitate the exploration. After pulling up the omentum a dark-colored cyst was found, occupying the position usually occupied by the bladder in front of the uterus. It had a grayish, semi-gangrenous appearance, and yet when

tapped, the serum that was removed was clear, limpid and transparent, and of light amber color. The dark appearance was evidently due to the venous blood filling delicate newly formed vessels. About 4 ozs. of fluid were withdrawn. The sac then bled very profusely upon attempting to enucleate it. It was in the way, and was removed by ligature in sections. The pus tubes were then peeled out and tied off. The severe manipulations had ruptured several of the small pendulous cysts, and they bled freely. It was therefore necessary to tie off about twenty-five of these little bodies. Each was filled with the same kind of fluid, and each hung by a slender pedicle. They resembled the little pendulous cysts accompanying and supposed to be indicative of malignant disease. May not these little bodies, when accompanying malignant disease, be simply due to the prolonged and gradual peritoneal irritation?

The patient made an excellent recovery. I fear that she would have lost her life from hæmorrhage had I not used Trendelenberg's position, because it was difficult to find and tie all the bleeding points. The patient has since developed secondary syphilis, but I presume that it has been contracted since operation.

Case 2.—Mrs. H., æt. 33. First seen October, 1889, when I diagnosed uterine fibroid, and advised removal of ovaries and tubes. Patient went into the hospital intending to have the operation done, when she developed an abscess in the left groin. I opened this and found that it led down to the left side of the cervix uteri. She then convalesced, and left the hospital without having any further operation. The pain continued and the sinus remained unclosed. I saw her again in January, 1892, and advised further operation to discover the exact nature of her trouble. I operated on February 12, 1892. On opening the abdomen, I found a fluid tumor, evidently between the bladder and uterus, very adherent to bowel and desperately fixed in the pelvis. Patient placed in Trendelenberg's position, and the adhesions between the cyst and rectum and uterus torn through. I had difficulty in avoiding the ureter on the left side. At last I was able to make out the left uterine cornua. The left tube was coiled up and somewhat thickened, and very hard. The tumor I suppose was one of the left ovary, but so adherent that no definite pedicle could be made out. I tied it off both at uterine and rectal end. Hæmorrhage from the bowel was controlled in several places by ligature. The peritoneum was studded in several places with small grape-like cysts exactly similar to those mentioned in Case 1. I tied off about six or eight of them. The right ovary and tube were not enlarged, though imbedded in adhesions. The patient made an excellent recovery and is in splendid health.

Such cysts as those described are not, so far as I know, found in any other serous cavity. Why should they affect the peritoneum alone? I believe the answer to this question will give us a clue to their true pathology.

I recognize two forms of peritonitis, acute and chronic. The acute may become chronic, and if the formation of adhesions be considered as a chronic condition, then acute peritonitis may be said to always become chronic.

Acute peritonitis may terminate in the absorption of the fluid or in the non-absorption of the fluid poured out.

It may terminate in the formation of adhesions or of false membranes. It may be purulent from the first or become purulent, and the pus may be pocketed in multiple pockets or the serum may remain unabsorbed, and become pocketed as it did in Case 1, and terminate in the formation of numerous pendulous cysts.

Now to return to the pathology of cysts. Are these cysts simply the representatives of isolated pockets, or are they formed in some other manner? My own belief is that that they are simply the remnants of pieces of false membrane enclosing serum.

Cysts filled with air we have already considered. There are three other forms, excluding dermoids and hydatids, namely: those filled with serum, lymph and blood.

The lymph-filled sacs are probably formed by the formation of false membrane over the stomata and the escape of lymph beneath it. But believing as we do, that the lymph stream is away from and not towards the peritoneal cavity, it would appear as if this theory of lymph-filled cyst formation were incorrect.

How are the blood cysts formed? Is the cyst originally a serous cyst with secondary hæmorrhage into its cavity, or is it originally an extravasation that becomes a cyst? I believe the former, because subperitoneal hæmorrhages are usually found as flat spots of ecchymosis.

In the two cases recorded, the cyst wall was like the very finest tissue paper. It did not look like peritoneum, and I do not believe that it was peritoneum. From the peculiar foldings and bands running from surrounding parts to the cyst, I concluded that the wall was composed of false membrane. If composed of false membrane, then the cysts must be inflammatory in origin, and we had sufficient evidence of old inflammation to lead us to believe that this might be the case. And now in conclusion, let me say that I believe that we have a distinctly inflammatory cystic disease affecting the peritoneal cavity; that it is not of rare occurrence; that if the condition producing the inflammation be removed and the cysts tied off, the patient will become entirely well; that I know nothing of the ultimate result of such a case if left alone; and that I hope others will record any cases of the kind with which they have met.

Two practical points might be dwelt upon. First, that the rupture of such little vesicles might be a source of hæmorrhage into the peritoneum after operation: and secondly, that to avoid the danger of hæmorrhage, they should be ligated with fine silk when met with during the course of operation.

A REPORT OF EXPERIMENTS GERMANE TO THE SUBJECT OF ABDOMINAL SUPPORTERS AFTER LAPAROTOMY.

Read before the Section of Gynecology, at the Forty-third Annual Meeting of the American Medical Association, held in Detroit, Mich., June 10, 1892.

BY ROBERT T. MORRIS, M.D.,
OF NEW YORK.

Rabbits were used for the experiments because it did not happen to be convenient for me to use larger animals, although the latter would have been better. An incision about an inch and a half in length was made in the middle abdominal line in a series of adult rabbits and then the wounds were closed with catgut in two tiers. The first tier included peritoneum, muscle and fibrous tissues. The second tier united skin margins.

The method of examining the character of repaired tissues afterwards consisted in dividing up the abdominal walls into half inch wide strips, cut transversely, the rabbits having been killed with chloroform. The strips were then dissected in such a way that skin was separated from muscles and muscles from peritoneum. The strips of separate tissues were tossed into a beaker of water to prevent drying while tests were being made to determine the strength of any one tissue. The apparatus for the testing consisted of a pair of screw clamps and a spring balance registering pounds up to fifty. One end of a strip of

tissue was fastened between two little blocks of wood with one screw clamp. Then the other end of the strip was gripped in the same way with the other clamp. The spring balance was hooked to one clamp. Then I pulled on the other clamp and watched the indicator of the balance until the tissues gave way.

The first rabbit was killed at the end of the third day. The strips of skin from an unwounded part of the abdomen pulled apart at a pull of about eighteen pounds. A corresponding strip of wall, including muscles and fascia resisted a pull up to about sixteen pounds. The peritoneum pulled apart at about seven pounds tension force.

Tissues of strips taken from a sutured segment, after the sutures were removed did not hold as far as the one pound pull point in this first rabbit.

At the end of seven days, the second rabbit was killed, and I wasted all of the strips in trying to get the delicate peritoneum separated fairly for tests. A third rabbit was then killed immediately and I learned that by a little trick of pinching up peritoneum in a certain way it could be dissected away from muscular walls. A strip of normal peritoneum and a strip of peritoneum including the wound line, each gave way at almost precisely the same tension point with eight pounds pull. A strip of normal muscular wall gave way at fourteen pounds pull, and a strip including wound line, gave way at the wound line with five pounds pull. A strip of normal skin pulled apart at about seventeen pounds tension, and a strip of wound skin gave way at two pounds pull.

At the end of ten days the fourth rabbit was killed. It was quite evident that the peritoneum at the wound line was similar to normal peritoneum in every way. At this time the muscular walls began to give way at the point of some stitch hole in the wound line, and although the separation was principally in the wound line, the tear began to extend into the normal tissues in the vicinity when the tension force was exerted. The skin still tore through the wound line without involving any normal skin in the tear.

At the end of fourteen days the fifth rabbit was killed. Wound peritoneum similar to normal peritoneum. Muscular tissues at the wound line did not tear open along any one direction, but when the strips were subjected to tension the fibres of the strip began to slide from each other very much as the threads of some woven material might slide apart. This process took place in strips from the wound line at practically the same pulling force that was required for separating the tissues of normal strips which gave way in a practically similar manner. In this fourteen day rabbit the skin still gave way in the wound line at a lesser pull than was required for the normal skin, but the sliding of fibres was observed to begin to extend into normal skin on either side of the wound at this date.

At the end of eighteen days the sixth rabbit was killed and all structures were found to be united by reparative processes as strongly as they ever would be apparently. It was observed, however, that tears which began near the wound line always ran to a stitch depression, or else they began at a stitch depression and extended out into the surrounding tissues.

In the seventh rabbit, which was killed at the end of twenty-one days, and in the eighth rabbit, killed at the end of thirty-eight days, the same observations were made practically as in the eighteen day rabbit. It was perfectly evident that if the cut structures of an abdominal wound are properly sutured at the time of the operation any supporter applied after the period of repair has passed are superfluous as far as prevention of hernia is concerned, and on the other hand, if any weak point remains as a result of imperfect suturing, a supporter is useless in the way of helping out the defect.

The tiny depressions left at the site of sutures were the weakest points in the abdominal walls of the rabbits, and in the human species any little portion of abdominal wall that was not perfectly united would in the same way remain as the weak point.

Several years ago, before I had engaged in abdominal surgery, it was my fortune to be in a position to see numbers of herniæ that had followed abdominal operations by different operators, and I afterward learned that these cases occurred in the practice of men who employed the single suture for all structures of the abdominal walls. I adopted very early the plan of suturing the separate structures of the wound separately and as a result have never had a hernia follow a laparotomy. If one ever does follow I shall suspect that I may have been in a little too much hurry at the time of the operation. One or two of my acquaintances who use the single suture have not had herniæ follow, but they employ a very large number of the single sutures and place them very closely together.

The plan of suturing that I have followed consists in first suturing peritoneal margins together with catgut that is absorbed in one week. The next tier of sutures is composed of catgut that is absorbed in eighteen days, and this series of sutures is employed for very close approximation of the muscular and fibrous structures. The third tier of sutures closes the skin wound and is composed of catgut that is absorbed in seven days, but if the patient is very fleshy a catgut that remains for eighteen days is again used. My patients, as a rule, are allowed to get out of bed on the seventeenth day after laparotomy, and they never wear supporters in the idea of preventing hernia. If my patients find comfort in wearing any sort of bandage for general support, they are allowed to wear what they please.

After operations for the removal of the vermiform appendix, I now employ four tiers of sutures, the extra tier of catgut being used for the superficial fascia, which is an extremely important structure at the site of this operation. I do not propose to have any of the herniæ that are now being reported as common after appendix operations, and none of the patients are to wear "hernia preventing" supporters after they are out of bed either.

WOUNDS WITH DYNAMITE.—The action of dynamite seems to be almost as chaotic as that of lightning, to judge from an occurrence related in *La Science Moderne*, an abstract of which is given in a recent number of *L'Union Médicale*. A nickel-miner was fishing with dynamite cartridges, when one of them exploded as he was in the act of casting it, and carried away one of his hands. During the twelve hours that it took to convey him to a hospital ship, under a tropical sun, gangrene set in, and he died shortly after reaching his refuge. His body was riddled with communicating subcutaneous channels, and at the post-mortem examination it was found that the nails of the lost hand, having been detached, had acted as projectiles, and were found near the spinal column in the thoracic region.—*New York Medical Journal.*

MY OPERATIVE EXPERIENCE IN "PUS CASES."

BY I. S. STONE, M.D.,
SURGEON TO COLUMBIA HOSPITAL, WASHINGTON, D. C.

The following brief recital of a personal experience includes only cases selected from those occurring in my service at Columbia Hospital during the past year. In that time twenty-five cases have been referred to me for operation in which pus in varying amounts was found in the pelvis or abdomen. It will be therefore understood that this is not an account of my "year's work in gynecology," for I shall not mention other surgery for the present. Of these twenty-five cases three have died. But if I add to these the remainder of my pelvic cases I would have nearly fifty without added mortality. I shall limit myself to the consideration of these pus cases alone and shall not mention oöphorectomy, ovariotomy or any other surgery. The organic law of the Columbia Hospital demands that all cases requiring a laparotomy shall be submitted to a consultation of the visiting staff, composed of four surgeons, two of whom are obstetricians and two are gynecologists. It may therefore be taken for granted that only severe cases are treated surgically and unnecessary operations are not performed.

In all of my cases a cause was clearly found for the pathological condition. In about two thirds of the cases, sepsis following abortion or delivery at term, proved the cause. The remainder were due to gonorrhœa. In all of my post puerperal cases the acute stage had passed, and it is impossible to say just how many were due to infection by gonorrhœa, or to that from other sources. One of my cases of post puerperal infection followed rupture of the uterus after labor or during the after treatment. Five cases were the victims of puerperal septicæmia continuing for four, five, and in one case eight months, following delivery at term. These women looked like victims of phthisis, or malignant disease. Six cases had pelvic abscesses of all sizes to a quart of pus following upon gonorrhœa for from one to twelve or more months.

One of the most interesting cases was the result of specific infection of a bicornate uterus.

Clinical History.—The account given by the patient of her suffering, is generally sufficient to indicate suppuration within the pelvis. They tell of pain, peritonitis, rigors and sweats, and slow getting up after delivery. These symptoms demand that a careful pelvic examination be made which will always clear up the diagnosis. Strange enough it is, yet true, that quite a large proportion of these patients claim that they were treated for neuralgia, malaria, etc., and that no pelvic examination had been made by the attending physician.

Of all symptoms pain is the most indefinite. It is always present in varying amount, but is never a positive indication of the extent of disease. Many neurotic patients have far greater tenderness in the ovarian region, and complain more of pain than is elicited in the examination of a pelvic abscess. Neither is the temperature an indication of the extent of disease. We may see a temperature of 100° in morning and 102° in afternoon in a patient with pelvic abscess containing a pint of pus, and with extensive bowel adhesions. Per contra, a small pyosalpinx may cause a rise to 104° P.M. Some of my cases of pyosalpinx with adhesion had no rise of temperature. But we must never underestimate the important information given by the thermometer, for continued high temperature in these cases means trouble ahead for both patient and operator.

The pulse will furnish much information.

A pulse of 140 or above with a continued high temperature means an ill patient. It means a difficult and dangerous surgical operation where all the resources of the well appointed hospital, and the best surgical skill may be required to meet the many possibilities of such surgery as is necessary to save life. The information gained by the pelvic examination of these patients is final and most satisfactory as a rule. My plan is first to examine without, and afterward with, an anæsthetic. Rarely it is important to learn more than to be sure that pus is, or is not, present—or rather, is an operation demanded or not? I fail to see any benefit to be derived from nice distinctions about diagnosis. Such refinements are absurd to the practical surgeon. The preparation of the patient includes tonics, laxatives and good food, cleanliness, cheerful surroundings. I prefer always to give quinine at once after admission, to watch its effect upon the temperature. Not infrequently a rise of temperature during convalescence after operation is promptly reduced by the administration of quinine, showing a malarial complication. So much has been said about expedition, and everything else a surgeon must have in mind during an operation, that I shall not refer to this part of my method or opinions. Each one has an individuality peculiar to himself and cannot be a surgeon without this *sine qua non*. Drainage is just as important as it ever was in many cases, but the glass tube reaches a limited area and I am finding great comfort and satisfaction in the use of the gauze drain. It has done good service in every case, and it is scarcely necessary to say that it is used in very severe cases.

Hæmorrhage has never been difficult to control. Every important vessel can be brought into view by means of the Trendelenburg posture, which I find very useful. Flushing the abdominal cavity is also just as beneficial as Joseph Price claims it to be. I find myself occasionally doing without it, since I use the Trendelenburg posture for difficult cases. I quite agree with those who claim that it rarely if ever does harm. It is also occasionally necessary to use aristol as suggested by Dr. Robert T. Morris of New York. After separating formidable adhesions it is very desirable to prevent the reforming of these dangerous impediments to the peristaltic action of the intestines. Aristol may be freely sifted over these surfaces without fear of harmful result. In the after-treatment my method is to sustain all the cases of laparotomy for pelvic abscess by giving food and stimulants by rectum at once, and by the mouth just as soon as they can be borne. Patients must not be allowed to remain the usual *twenty-four hours without nourishment*.

In the treatment of nausea, if persistent, I resort to lavage in any case. It is the most potent agent for good I have ever seen tried. Of course the usual sip of hot water, and even creasote may be tried, but when these fail it seems unkind to try every drug with a reputation as a composer of sick stomachs. A clean stomach is often in my experience the forerunner of an appetite. With soap and water for the hands, clean dressings, instruments, sutures, etc., all

suppuration can generally be avoided in the abdominal wound. Chemical antiseptics, I do not find essential. The only use these agents have in my laparotomies, is where the hands of assistant or operator need to be quickly cleansed during an operation, and where the usual time and care cannot be given them. Clean boiled water is used without any chemical whatever. Suppuration may generally be avoided in all cases where the abdominal wound is not infected by pus or serum removed. The greatest care bestowed upon hands, and instruments, will not prevent infection of the wound, if fetid pus from a suppurating dermoid cyst, or even that from certain pelvic abscesses, comes in contact with it. It has never been my misfortune to have a ventral hernia follow a laparotomy. All operations done for pelvic abscess or pyosalpinx have been completed. In one or two cases very small ovaries were not found even after careful search. They were, if present, too small to have any pus in them. No exploratory operation for pus has been undertaken by me.

The following case is reported to show how fatal an attack of gonorrhœa may prove.

Case 15.—Mrs.—— had contracted gonorrhœa from her husband and came to my office for treatment. She was at once sent to the hospital where in a short time the vaginitis was cured. But in two weeks she had cystitis, then nephritis. An ovarian abscess on left side holding a pint of pus rapidly formed. Operation was refused at first and was only done as a last resort. Patient did well for three days, then came suppression of urine, uræmia and death on fifth day. The autopsy showed a perfect condition of the pedicles and peritoneum. No peritonitis. Death due to nephritis in less than five weeks after infection from gonorrhœa.

The next case, also fatal, is cited to show how easily some patients succumb to shock. Also how sepsis following abortion may continue indefinitely and not recover.

Case 26.—Miss——, age 19, had an induced abortion one year previous to her admission to the hospital. History of pain in pelvis, gonorrhœa, inflammation of bowels, purulent vaginal discharge, large mass in right and smaller one in left ovarian region; uterus fixed and low down in the pelvis. Operation difficult, and bowel much injured in one place but returned hoping for good results. Patient did badly from the start. Bowels refused to respond to salines. Distension. Again resorted to irrigation. Pulse did not recover its tone. Death on third day. I am unable to say why this patient could not stand the shock of operation. She had the very best care during the after treatment.

The next case (No. 18), I report to show that a perfectly satisfactory operation may fail of its object, partly owing to lack of care in after treatment.

Mrs.—— had puerperal septicæmia followed in—— by a large pelvic abscess extending to umbilicus at time of section. High temperature to 104. Pulse 130. Everything fixed in pelvis and lower abdomen. During the two weeks she remained in the hospital prior to operation she grew steadily worse and a bad result was not altogether surprising. The difficulty of the undertaking can only be known to those who have wrestled with these formidable cases. The operation required about an hour, and very much pus escaped and was washed out of the cavity. Although the operation was well done, as shown at autopsy, she had severe shock, and in absence of nurse for a few moments from the room the night after the operation, arose from her bed with the glass drainage tube in position. I consider this case a sacrifice to the unfortunate theory of some of our leading surgeons who say starve these cases for 24 hours. This patient needed food and stimulants from the start which she did not get until too late.

The next case (No. 17), in many respects like the last, only following gonorrhœa instead of puerperal septicæmia.

A woman, age—— and married, had symptoms of pelvic abscess for —— before admission to the hospital. After admission her condition grew rapidly worse and a tumor now reaching nearly to the umbilicus was of uncertain character. Her temperature and pulse gave positive evidence of the severity of the disease and of the necessity for operative treatment. I pause here to remark that to have aspirated any of these cases through the vagina, would have reached only a small area of the disease, and would have evacuated very little of the accumulated pus. In opening the abdominal cavity the omentum was, as is so often the case, adherent to everything in its reach. It was difficult to find an opening or crevice anywhere to even begin the work of separation and enucleation. Many visitors present, among others the hospital staff and Professor Lovejoy of the Georgetown Medical College, were invited to inspect the tumor after the abdomen was well opened and omentum removed, but without any definite conclusion. It is well to be frank, and hence I cheerfully admit that I was unable to say with my hands upon the mass just what was within. The separation proceeding, however, soon revealed abundant pus, which gushed out freely, and although the operation was difficult, was well done, and after much anxiety for a few days she made a perfect recovery. The temperature and pulse chart of this case is very interesting. Both were high before section, and very gradually recovered afterwards. A striking feature of these pelvic abscesses is the very small amount of debris found and removed. The remains of this woman's tubes and ovaries give no conception of the kind of surgery required to complete the operation.

The separation of adhesions in this case was done without tearing the bowel, and the abdominal wound healed nicely and without suppuration.

Septic Disease in Uterus Bicornus.—Another interesting case, No. 22, occurred in a young negress following gonorrhœa. When first admitted she appeared to have a fibroid tumor reaching the umbilicus, with suppurating tubes and ovaries. High temperature, quick pulse and other signs of pelvic disease present. The case was considered by the visiting staff so undesirable a subject for operation, that she was allowed to remain for several weeks under observation, during which time she gained somewhat, and a favorable time was selected after her condition had improved. The operation was nearly completed before the discovery was made that I had really removed the tube, ovary and a portion of the bicornate uterus. This was not extremely difficult save for the broad pedicle, which was very deep down in the pelvis, and so closely attached to the uterus as to cause some delay. When the left side was undertaken the real nature of the case was understood, and fortunately no serious disease existed, and operation was not required upon that side. The sac contained very thick and peculiar, ill-smelling pus. Recovery uneventful save for a slight dementia which continued a few days only, and was of the happy or ecstatic variety. She proved quite entertaining to her nurse, and discoursed tuneful melodies without number. Another interesting case recently treated deserves mention. Had septic metritis, high temperature, etc. A month or six weeks previously had child at term, followed by septicæmia. A mass in right ovarian region supposed to be Fallopian tube. Temperature 102°, pulse 120. Patient and consultant refused to assent to an operation until several weeks had passed, during which time she steadily grew worse. Operation difficult from the start. Omentum glued to everything, and dipping down over right appendages, was inserted in the wall of the uterus just above the attachment of the bladder. When scooped out, a large opening was found into the uterine cavity, through which the index finger was freely passed. Infection had entered the pelvis and abdomen through this channel. The intestines were badly torn in separating adhesions, requiring many sutures before they could be returned. I was anxious about the patient until her bowels acted, for fear that I had closed the bowels too tightly. Her convalescence was uninterrupted after her bowels acted, fifty-two hours after section. I should have remarked that I packed this patient's pelvis with gauze, and dusted aristol over intestines where previously adherent. Gauze was used all around the uterus, for fear of infection through the uterine wound, as it could not be entirely closed with sutures, owing to the friable nature of the tissues. Still more gauze was passed down in the vicinity of the right broad ligament, where the intestines had been very adherent. The glass drain discharged but little fluid, while the gauze poured out an abundance.

These formidable cases are fortunately, as a rule, safe for full and complete recovery, after the danger incident to the operation has passed. Thus far, I

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have more satisfaction with this surgery than any other. It is always best to complete the work well, when once undertaken. Otherwise the old method of puncture through the vagina will be again heard from. In this connection I wish to say that I have seen at least four cases where puncture through vagina reached pus in the broad ligament, and was followed by an apparent cure. But if any practitioner will witness one of these sections, and see how perfectly thin and healthy the broad ligament remains after all adhesions and disease have been removed, he must indeed be hard to convince if he still believes in the old theory of "cellulitis" as explaining these pelvic masses.

Finally, and in conclusion, I must refer to the minor cases which have been operated upon, and which are abroad in the land by scores, without recognition. One case, No. 20. W. had been married sixteen years; one conception; pelvic disease ever since. Pain, retroflexion, sterility. Treated for months at a time by various physicians. Finally, after nearly two months more of treatment under my own supervision without result, section. Two large pus tubes like sausages. No trouble whatever in convalescence.

Another patient (Case 12), unmarried, had gonorrhœa some months before admission to hospital. Vaginitis treated. Pain in both ovarian regions, rapidly growing worse. Section. Plenty of pus in ovaries and tubes. Perfect recovery.

Another (Case 34) contracted gonorrhœa from husband. In four weeks pyosalpingitis of right side, involving intestine. At time of section free pus poured out of left tube. Fimbria of right tube implanted upon intestine like a placenta; ovarian and tubal abscess. Bowel gave much anxiety, as it was badly necrosed. Gauze packing and drainage after flushing. Perfect recovery. The length of this article forbids further mention of these very interesting cases.

THE PATHOLOGY OF INTESTINAL OBSTRUCTIONS FOLLOWING ABDOMINAL AND PELVIC OPERATIONS.

Read in the Section of Obstetrics and Diseases of Women, at the Forty-third Annual Meeting of the American Medical Association, held at Detroit, Mich., June 7, 1892.

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Notwithstanding the brilliant results which have been attained in modern abdominal and pelvic surgery there is still much to learn and to improve upon in our operative technique before some of the distressing after results of these operations are prevented or at least rendered less frequent. Among the most important of these post-operative complications I would include intestinal obstructions.

An enormous amount of literature has been written upon acute intestinal obstruction as a surgical disease and the subject is, very properly, receiving the attention it deserves in our medical societies, but, as yet, little has been done toward solving the problems suggested by bowel obstructions following abdominal and pelvic operations. It is, therefore, my purpose in this paper, which I have the honor of presenting before this Association, to enter into the pathology of these obstructions and to discuss such views of the subject as my own experience and that of other surgeons may suggest.

In discussing the pathology of bowel obstructions following intra-peritoneal operations I shall limit myself strictly to those causes dependent upon operative interference and not refer to the causes of acute obstruction from the standpoint of a surgical disease.

I shall classify the causes of post-operative obstructions as follows:

1. Adhesions between the intestine and raw surfaces.
   a. To an omental stump.
   b. To denudations of the pelvic and parietal peritoneum.
   c. To the edges of the vaginal wound following a supra-pubic or a vaginal hysterectomy.
   d. To a pedicle.
   e. To raw surfaces on the intestinal wall.
2. Paralysis of the intestines.
3. Local spasm of the intestines.
4. Impacted fæces
5. Bands of inflammatory lymph.
6. Adhesions between coils of intestine or between the gut and neighboring parts due to a traumatic inflammation.
7. Kinking or twisting of the intestine due to a faulty technique.
8. Including the intestine within the loop of an abdominal wall suture, or between the edges of the belly incision.
9. Slipping of a coil of intestine through a slit or an aperture.

Adhesions Between the Intestine and Raw Surfaces.—By far the greater number of bowel obstructions are due to this cause. A knuckle of gut becomes attached by an adhesive inflammation to a denuded surface and a kink results and an obstruction of the bowel follows. Naturally the question will be asked, how do we explain the fact that so few cases of obstruction occur from this cause when there are so many bad pelvic cases requiring the separation of extensive adhesions? My answer is, that kinking does not necessarily follow the fixation of a knuckle of intestine unless the gut adheres in an abnormal position. In other words, if the normal position of a coil of intestine is near the position of the denuded surface to which it adheres obstruction will not as a rule follow. Furthermore, I believe that many of the cases which die after abdominal and pelvic operations, and the cause of death is ascribed to peritonitis, are in reality undiagnosed bowel obstructions.

The following cases present points of great interest in connection with this class of obstructions.

Case 1.—Reported by Meredith.[1] Section for double cystoma with extensive adhesions. *Secondary Section*, eighth day. The peritoneum was intensely red and congested, evidently in the first stage of acute inflammation. "Attention was attracted to a coil of greatly distended small intestine which was badly kinked and obstructed in consequence of the traction exerted upon it by a portion of the ligated omentum which was closely adherent to its surface." There was no other obstruction. The patient recovered.

Case 2.—Reported by Krug.[2] Section for double pyosalpinx and ovarian abscesses. Adhesions especially extensive behind uterus. Irrigation and drainage. *Secondary Section*, Fourth day. Signs of beginning peritonitis. A portion of the descending colon was found glued fast as an angular loop to the posterior surface of the uterus. The patient recovered.

[1] London Lancet, 1886, p. 64.
[2] Amer. Jour. of Obstet., 1890, xxiii, 1371.

Case 3.—Reported by Ahern.[3] Section for large cyst of right ovary. Adhesions to brim of pelvis on left side and to sigmoid flexure. Raw surfaces two in number, and ½ of an inch in diameter each. No drainage. *Secondary Section.* Ninth day. Upper part of small intestines congested and distended. Adherent to pedicle and to both denuded surfaces. Below the adhesion the bowel was contracted. The coil of intestine at point of adhesion formed an acute angle. The patient recovered.

Case 4.—Reported by Anderson.[4] Section for ovarian cystoma. Adherent to parietal peritoneum just above the position of the cæcum. *Secondary Section.* Twentieth day. Coil of small intestine adherent to raw surface just above the position of the cæcum. Below the adhesion the gut was collapsed, above distended. The patient recovered.

Case 5.—Reported by Coe.[5] Vaginal hysterectomy. Uterus retroflexed and adherent. Ovarian cyst right side punctured and removed. No ligatures. Two forceps to each broad ligament, and two pairs to bleeding points in utero-sacral folds. Peritoneal wound left open. Tampon iodoform gauze. *Section.* Fifth day. A loop of small intestine adherent to the right edge of vaginal wound. No peritonitis. The gut was distended above the adhesion and contracted below. The patient died next morning from shock.

The following cases of "ileus after vaginal extirpation of the uterus," quoted by Coe from a paper by Reichel[6] are of great interest.

Case 1.—*Section.* Seventh day. The lower part of the ileum was attached to the edge of the vaginal wound. Gut above distended. No peritonitis. Patient died on the table.

Case 2.—(Olhausen.) *Section.* Ninth day. A coil of ileum adherent to edge of vaginal wound. The gut was bent at an angle. Died in 24 hours. *Post mortem.* Diffuse peritonitis. Two other coils found attached to edge of vaginal wound.

Case 3.—Collapsed and died on the eighth day. *Post mortem.* Coils of intestine adherent to edge of vaginal wound, the gut above greatly distended. The large intestine contained fecal matter, therefore, the obstruction was not complete. No general peritonitis.

The four following cases of obstruction consequent upon vaginal hysterectomy are also quoted by Coe.

Case 1.—Bakelmann's patient.[7] Died on seventh day. *Post mortem.* Lowest part of ilium adherent to edge of vaginal wound. Gut distended and bent at an angle.

Case 2.—Leopold's patient.[8] Death on fourth day. *Post mortem.* Two coils of intestine adherent to edge of vaginal wound. The gut bent at an angle.

Case 3.—Landau.[9] *Section.* Seventh day. Adherent gut to edge of vaginal wound. Died next day.

Case 4.—Coe's patient.[10] *Section.* Second day. Two or three coils of illim adherent to edge of vaginal wound. Gas escaped per anum after they were detached. No peritonitis. Death in four hours.

These cases illustrate in a forcible manner the explanation and dangers of obstructions due to raw surfaces. In every one of the abdominal sections the obstruction occurred at a point where adhesions were separated at the time of operation. Again, in every instance, the intestines were fixed in an abnormal position and at the point of fixation formed a more or less acute angle. In the case reported by Krug where he found the descending colon "adherent as an angular loop to the posterior surface of the uterus" we have an instructive illustration of these points. The cases quoted of obstruction following vaginal hysterectomy, also demonstrate clearly the cause of bowel fixation and kinking dependent upon an adhesive attachment of the intestine to a raw surface.

The practical operative lesson all of these cases teach us is, that when we perform a secondary section for their relief we know where to look for the seat of obstruction if we have kept in mind the position of denuded surfaces made at the time of the original operation.

Paralysis and Local Spasm of the Intestine; Impacted Fæces.—As the pathology of all of these causes of obstruction is the same, I shall discuss them under one heading. First, however, I shall cite some cases illustrating this class of intestinal blocking.

Case 1.—This case occurred in my own practice. Section for double pyosalpinx with slight adhesions. Irrigation, but no drainage. Death on fifth day. *Post mortem.* The small intestine, for a distance of 8 inches from the ileo-cæcal valve, was tightly contracted, causing an absolute obstruction. Above the contraction the gut was greatly distended. At the seat of constriction the bowel was red and congested, but no lymph was found. The abdominal cavity was dry. There were no adhesions.

Case 2.—Reported by Baldy.[11] Supra-pubic hysterectomy; extra-peritoneal treatment of the stump. *Secondary section.* Sixth day. Intestinal evacuation and drainage. Death in twenty-four hours. *Post mortem.* Intestines free, "but in one or two places had contracted so as to feel like hard cords."

Case 3.—Reported by Baldy.[12] Section for double pyosalpinx. Inflammation of some of the pelvic loops of intestine. *Secondary section.* Fourth day. Bowels enormously distended. Intestinal evacuation and drainage; death in twelve hours. *Post mortem.* "There was nothing abnormal found excepting the peritonitis affecting the coils of intestine in the pelvis. There was a slight adhesion of these coils to one another."

Case 4.—Occurring in my own practice. Section for chronic inflammation of the appendages. Dense pelvic adhesions. *Secondary section.* Twentieth day. Small intestines somewhat distended; no evidence of peritonitis or pus. The descending colon was tightly packed with hard fæces from the splenic to the sigmoid flexures. Bands of lymph constricting slightly the bowel near the sigmoid. The patient recovered.

The true explanation of obstructions due to local spasm or paresis of the bowel will, most probably, be found in a study of the influence of various stimuli upon the nerves controlling intestinal peristalsis. The intestinal walls contain an automatic motor centre—the plexus of Auerbach—which influences the peristaltic action of the bowel. "If this centre is not affected by any stimulus, the movements of the intestines cease—comparable to the condition of the medulla oblongata in apnœa. The same is true—just as in the case of the respiration—during intra-uterine life, in consequence of the fœtal blood being well supplied with O. This condition may be termed aperistalsis. It also occurs during sleep, perhaps on account of the greater amount of O in the blood during that state. All stimuli applied to the plexus myentericus increase the peristalsis, which may become so very violent as to cause evacuation of the contents of the large gut, and may even produce spasmodic contraction of the musculature of the intestine. This condition may be termed dysperistalsis, corresponding to dyspnœa. The condition of the blood flowing through the intestinal vessels has a most important effect on peristaltic movements. The continued application of strong stimuli causes dysperistalsis to give place to rest, owing to over-stimulation, which may be called intestinal paresis or exhaustion."[13]

With these facts before us concerning the effects of the absence or the presence of stimulation upon intestinal peristalsis we are able, most probably, to explain the pathology of these obstructions. For the first

[3] Amer. Jour. of Obstet., 1891, xxiv, 326.
[4] London Lancet, 1889. ii, 894.
[5] Amer. Jour. of Obstet., 1890, xxiii, 144.
[6] Zeitschrift fur Geb. u. Gyn., Band xv. Heft 1.
[7] Archiv. für Gyn., Band xxv, Heft 1.
[8] Archiv. für Gyn., Band xxx, Heft 3.
[9] Berliner Klin. Wochenschrift, 1888, No. 10.
[10] Amer. Jour. of Obstet., 1890, xxiii, 469.
[11] Journal of Gynecology, August, 1891.
[12] Journal of Gynecology, August, 1891.
[13] Landois, second Amer. edit., p. 263.

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twenty-four or forty-eight hours after an abdominal section the intestines are in a condition of aperistalsis if the case be doing well. There are several factors concerned in bringing about this state. In the first place, the preparatory treatment of the bowels with salines, the liquid diet and the absence of food after section leave the intestines comparatively empty, thus removing the intestinal contents as a factor in stimulating peristalsis. Again, the rest in bed for two or three days before an operation, and the enforced quiet afterwards, add largely to the absence of intestinal activity. This condition is not only observed immediately after an abdominal section, but also after parturition or, in fact, in all cases in which the patient is required to lie quietly in bed for some time. The well known fact that changing the position of the patient in bed relieves tympany in some cases, and favors the downward movement of gas, shows the effect of exercise upon intestinal peristalsis.

The causes of operative stimulation of the intestines are: exposure to the air, lowering of the temperature, bruising, healing of denudations, peritonitis, operative procedures, irritating fluids, septic materials, and a neglect to thoroughly empty the bowels prior to operation.

We have found that dysperistalsis and paresis depend upon the same cause, namely: an irritation of the motor centres of the intestine, but that the intensity and duration of the abnormal stimulation alone determines the difference between the two conditions. For example, a simple congestion of the intestinal blood-vessels would most probably, even if long continued, result in a condition of dysperistalsis, while a severe inflammation, on the other hand, would cause a state of paresis.

In cases Nos. 1 and 2 there was a condition of intestinal dysperistalsis present, causing the obstruction. In both cases, at the beginning, this condition alone existed, but subsequently paresis of the gut above the constriction occurred, due to the continued effort made by the intestine to push its contents beyond the obstruction. The increased amount of gas and fluid in the bowel also aided in producing exhaustion, as they were necessarily a source of continued irritation. In case No. 1 the intestinal spasm was probably the result of the congestion, which was practically limited to the seat of constriction in the bowel. The cause of this congestion is difficult to determine. Possibly it may have been due to the irritation produced upon the intestine by the pus which escaped when the tubes were delivered, or the bowel may have been bruised during the operation, and a traumatic peritonitis was developing at the time of death. In case No. 2 the notes of the post-mortem examination were too superficial to be of any value in determining the cause of the nodulated condition of the intestines. Case No. 3 was clearly one of intestinal paresis due to peritonitis. The adhesions which were found between coils of the intestine after death were evidence that the peritonitis, which had existed at the time of the operation, had continued.

Case No. 4 is of especial interest. The patient had a bowel movement in forty-eight hours, and everything was doing well until she fell out of bed in her sleep on the third day. Now what had happened to bring about an obstruction due to fæcal impaction after this accident? I believe that the fall caused a traumatic peritonitis which resulted in paresis of the colon, and while the bowel was in this condition fæcal accumulations occurred. After the intestine had regained its normal activity, it was then unable to empty itself on account of the great amount of fæcal matter which had collected. In addition to this want of power in the gut, there was also more or less constriction, from bands of lymph, at the sigmoid flexure, which rendered the downward passage of the fæces difficult.

Bands of Inflammatory Lymph.—As the result of intraperitoneal inflammation following abdominal and pelvic operation, lymph is poured out upon the intestines, and coils of the gut become more or less adherent to each other. As a rule, no bad results ensue, but if the adhesions destroy the normal relations existing between the coils, or a knuckle of gut is constricted by a band of lymph, then kinking or strangulation follows. These obstructions do not manifest themselves early after operation, because no serious interference to the movements of intestinal fluids occurs, usually, until the bands of lymph begin to organize and to contract. Montgomery[14] reports an interesting case of volvulus caused by bands of inflammatory lymph. Five weeks after the original operation, for peritonitis, symptoms of obstruction came on, associated with fæcal vomiting. "The intestines were found matted together, so that over a yard of small intestine had to be forcibly liberated from extensive adhesions. The muscular coat was torn through at a number of points; a distinct twist was found in the small intestine, which was readily overcome by separating the bands of adhesions." The patient made a good recovery.

Adhesions between Coils of Intestine or between the Gut and Neighboring Parts, due to Traumatic Inflammation.—These adhesions have always been a subject of great interest to me. They result from an irritation of the serous membranes caused by the exposure of the intestines to the air, to lowering of their temperature, to handling or to necessary manipulations or operative procedures. This class of adhesions is, in my experience, a necessary sequence to all intraperitoneal operations. In fact they are, I might say, the opprobrium of abdominal surgery, for it must be indeed rare to have an abdominal operation not followed by more or less fixation of the viscera. In my experimental work upon the lower animals this fact has time and again forced itself upon me. For example, I have taken a perfectly healthy dog and performed upon the animal a lateral anastomosis without resection. At the time of operation not more than 10 inches of the bowel were exposed through an incision in the belly wall less than 2 inches in length, and every precaution was taken in the operative technique. Yet notwithstanding these facts, when the animal was killed in three weeks, after making an uninterrupted recovery, the intestines were so matted together that it was with the greatest difficulty I was able to separate the seat of anastomosis from the adherent coils of gut. This has been my experience, without an exception, in all my work upon the lower animals. I have seen numerous illustrations of these traumatic adhesions in the human subject revealed during a secondary section or a post-mortem examination. At an autopsy recently held at the Philadelphia Hospital upon a woman who had died three weeks after a supra-vaginal hysterectomy from disease of the kidneys, the intestines were found to be extensively

[14] Philadelphia Hospital Reports, Vol. I, 1890.

matted together. The hysterectomy was a very simple operation, without adhesions; the abdominal incision was small and there was no exposure of the intestines, and yet, after death, extensive fixations of the gut were found. It is a very common experience, in performing a secondary section, to find the gut or the omentum adherent to the parietal peritoneum at the site of the original abdominal incision. This fact is so well recognized that great care is always taken in reopening the abdomen to cut to one or the other side of the cicatrix, in order to avoid the danger of wounding a knuckle of adherent gut. Fortunately traumatic adhesions, as a rule, are not followed by fatal results, as they do not cause kinking or twisting of the gut. They do, however, not infrequently cause remote troubles by giving rise to colicky pains and more or less tendency to constipation.

Kinking or twisting of the Intestine due to a Faulty Operative Technique.—These obstructions are not the result of adhesions, but occur after anastomotic operations upon the alimentary canal, or after the repair of bowel lesions. For example, a coil of intestine may be kinked or twisted by placing it in an abnormal position in making an anastomosis. Or, again, the bowel may be torn transversely while separating adhesions during an operation, and, if the opening be large, suturing the tear may result in a fatal obstruction from kinking. Tears in the wall of the bowel which are longitudinal to its long axis may be safely closed with sutures, even if it is extensive, but a large transverse opening into the gut will almost certainly cause a kink if sutured.

Including the intestine within the loop of an abdominal wall suture or between the edges of the belly incision.—At first sight these causes of bowel obstruction may appear to the surgeon as being extremely unlikely, or at least very rare. Yet, if we will recall to mind our own operations, as well as those of other surgeons, I think all of us will be struck by the fact that such an accident is liable to occur when the abdominal incision is closed. There is but little danger, I admit, of including a loop of intestine when the belly wall sutures are introduced, as the abdominal contents are protected by a gauze pad or a flat sponge, but it is when they are tied that the accident is likely to occur. After the pad or the sponge has been removed the intestines come in direct contact with the loops of the sutures and press up, more or less, between the edges of the abdominal wound. Naturally, therefore, it is next to impossible for the surgeon to know positively that a portion of the gut has not been caught when the sutures are tied. Of course, if the gut has been fastened to the abdominal incision no immediate result will necessarily follow unless the lumen of the intestine has been obliterated, leakage occurs or kinking takes place. Consequently, we are not aware, in the majority of instances, that such an accident has occurred. Or, again, if the accident be followed by a fatal result, its true nature cannot be determined except by an autopsy.

Shively[15] reports an extremely interesting case in which death occurred five or six years after an ovariotomy from a bowel obstruction, which was the remote result of the fixation of the intestine to the abdominal incision. After the original operation the patient was always "greatly troubled with constipation and frequent attacks of colic." She was obliged to use strong cathartic pills to keep her bowels open. On August 8, 1883, she was taken ill. "She said she was ill with an attack of colic," August 11. Fecal vomiting. Death.

Post mortem.—"At the lower end of the line of the belly cut, a discolored spot, half the size of the hand was seen. The bowel was here adherent. There were also extensive adhesions of the intestines to the sides and posterior wall of the abdomen, thus preventing the appearance of tympany. The intestines and cavity nearly everywhere gave evidence of former inflammation. Also a portion of the ilium (18 inches above cæcum) was adherent to and incorporated with the cicatrix corresponding to the lower angle of the original wound, and that around the short portion between this and the cæcum a loop of small intestine was twice twisted, forming a kind of knot and a complete and effectual barrier to the passage of the intestinal contents."

Slipping of a coil of intestine through a slit or aperture.—This accident may occur from the following causes: 1. The result of adhesions. For example, a band of inflammatory lymph may be so attached that an aperture is formed. Or, again, a coil of the intestine or the mesentery may adhere and form a loop through which a knuckle of gut may slip. I saw an autopsy upon a patient who had died after an abdominal section, where the omentum was found adherent to the parietal peritoneum by two distinct attachments, thus forming an opening through which the intestine might readily have passed. An instructive point in this case lies in the fact that the adhesions were caused by two omental stumps which were left after the omentum had been ligated for adhesions at the operation. Larkins[16] reports a case in which death resulted from an obstruction following a jejunostomy. The original operation was performed for a cancer of the stomach, but in less than three months afterwards he did a jejunostomy on account of obstructive symptoms developing. The patient then did well for about two months when intestinal obstruction again occurred and death resulted.

Post mortem.—"There was a firm adhesion between the jejunum and the incision in the abdominal wall made in performing the gastro-enterostomy. The portion of jejunum taken in the jejunostomy was only two to three inches above this adhesion. The piece of jejunum between these two attachments to the abdominal wall formed a little loop, and between this loop and the parietes the upper segment of the jejunum had slipped. It was firmly nipped. The intestines above were greatly dilated and ruptured just above the seat of constriction; the intestines below were contracted."

2. A faulty method of dealing with tears or incisions through the mesentery. Thus, if the mesentery be torn during the separation of adhesions and the tear is not closed, and its flaps are not well sutured after the resection of the bowel, a coil of intestine is liable to slip into the opening and become nipped. 3. The slipping of a coil of intestine through the vaginal wound after complete removal of the uterus. 4. A knuckle of gut pushing its way through the intestinal loop formed in making a lateral anastomosis without resection. 5. From a fixation of the gall bladder to the abdominal incision. 6. From openings made through the transverse meso-colon and the great omentum to facilita

[15] N. Y. Med. Jour., 1884, vol. xl, p. 292.

[16] London Lancet, 1891, 11, 1222.

the attachment of the bowel to the stomach in performing gastro-enterostomy. In a case[17] of cancer of the pylorus in which this was done, the post-mortem examination showed that "almost all of the intestines were in front of the great omentum, having prolapsed through a hole in the transverse mesocolon and great omentum. There had passed all of the jejunum and the ilium to within four inches of the ileo-cæcal valve."

2011 Walnut Street.

SOCIETY PROCEEDINGS.

Gynecological Society of Boston.

Regular Meeting, held June 9, 1892.

THE PRESIDENT, AUGUSTUS P. CLARKE, M.D., IN THE CHAIR.

Dr. A. H. Tuttle, of Cambridge, read the following paper on

ANIMAL LIGATURES AND SUTURES, THEIR VARIETY, PREPARATION AND USES.

Surgeons are divided in their opinions upon the relative merits of various sutures. Silk, one of the first materials to be employed, is still the most popular, and many operators employ it almost exclusively. In the large surgical clinics throughout the world it forms the chief material for closing all kinds of wounds. Catgut and animal ligatures are comparatively of recent use, and offer the special advantage of being absorbed by the tissues, which makes it unnecessary to remove them. In all wounds which are aseptic, these sutures may be used, buried deep in the tissues, without piercing the cuticle or appearing upon the surface of the skin, the line of incision closed with collodion dressing or, in certain localities involving mucous surfaces, with the compound tincture of benzoin, containing a little iodoform, and the wound will be entirely healed at the end of five or six days, without evidence of suppuration. Does not this seem to be an ideal method? There are certain cases, however, where this cannot be accomplished, and where the healing in part is attended with suppuration, *i.e.*, recovery by second intention. In such cases imperfect results are liable to follow the employment of animal sutures, since they will be softened, absorbed, and give way before healing is effected. Gaping of the wound will then result, which would have been prevented had a more permanent suture been used. In abdominal operations it is better to use animal sutures entirely, even if pus is present, since it will remain long enough to do all that is required of it, and it is less liable to become a foreign body, with subsequent sinus formations, and slow cure. In earlier times, before the ideas of sepsis, asepsis and antisepsis had taken material form, silk and other sutures were used without any special preparation, and as might be supposed, primary healing in certain localities never took place. No better example of this can be given than the work of [1]Marion Sims upon vesico-vaginal fistulæ. It will be remembered that Sims operated a great number of times, and in fact had perfected his operation, without realizing its success, and it was only after he changed the material of his suture from silk to silver wire, that he succeeded in completely closing the fistulous opening between the vagina and bladder. To Sims, it seemed as though the substance of the suture brought up the balance in favor of success, but viewing the facts through the spectacles of to-day, we can see still farther, and realize that it was not the mere material from which the suture was constructed, but upon its aseptic preparation, that his success was won. It is a simple matter to make a suture of fine silver wire, free from irritating properties, and such measure of cleanliness as most surgeons used in those days, would render a suture of this kind practically aseptic. With silk, however, it is quite a different thing, and although it is easily sterilized by special measures, such as boiling, it would rarely be found free from irritating properties in the condition in which it was employed by the older surgeons. Experience has taught us the truth of these statements, for to-day, by simply sterilizing our suture, we can complete the operation for vesico-vaginal fistula without regard to the substance of which it is made. The aseptic condition of the suture is of the utmost importance, and if this condition is maintained, the suture, no matter what it be made of, may be placed almost anywhere without causing a great amount of irritation. If buried in tissue, most sutures, metallic ones excepted, will become absorbed, although it may take a long time, according to the material from which they are made. Firm union of parts should never take over ten days, when the union is by primary intention, therefore any substance which is used for a buried suture should be well under the process of absorption by that time, otherwise it will be in the way, and may retard the normal changes of repair. The animal ligature fulfils this requirement as nothing else will. It is owing to this fact that its growing importance depends. From a few, perhaps bold operators who used it at the beginning, there has been a steady increase in number, until now the larger part of the practicing surgeons of our country, and abroad, have come to recognize its value, and employ it. A great deal of opposition has checked its use, because it can only be made aseptic by a most careful preparation, and much of the material delivered from the instrument maker brought sepsis into the wound; furthermore, it may be absorbed too rapidly, and result in secondary hæmorrhage.

[2]Dr. Sims, of New York, objected to its use in operations upon the cervix uteri on the latter account. [3]Dr. J. C. Warren has said, "I would not rest easy if I had tied an ovarian pedicle with catgut until the danger of secondary hæmorrhage was passed." A study of the various methods of preparing catgut, employed by many prominent surgeons throughout the world is sufficient to demonstrate that the great consideration is its aseptic condition, and but little stress is placed upon its being absorbed too rapidly. This then, is really a great gain in favor of the use of animal ligature, since, a priori, its too rapid absorption was the strongest argument against the use of this material. If it would not resist absorption long enough for the wound to be united firmly and long enough for a good strong clot to organize in the larger blood vessels, sufficient to protect against secondary hæmorrhage, it would not fulfil the requirements of a suture, or ligature, and must sooner or later for this purpose become obsolete. The fact that surgeons no longer bother themselves with methods to increase the resisting power of the gut, against the absorbing powers of the tissues indicates very strongly that they no longer fear that effect, and in fact practical experience shows that under the proper circumstances we can depend upon animal ligature to hold until the parts are firmly united. Most of the evil consequences come from the use of septic gut.

[4]Klemm claims that abscess formation takes place frequently in wounds closed with aseptic gut, where all aseptic precautions have been taken; the infection arising during the operation, and developing in the culture medium formed from the dead softened material of the ligature. He says: "It is almost impossible to keep a wound germ free," and thus explains the cause of the trouble. His gut was prepared by washing repeatedly in five per cent. alcoholic solutions of sublimate, until there was no turpidity, and then storing it in absolute alcohol. This gut was exposed to culture experiment, and by this means, determined germ free

[17] Larkin. London Lancet, 1891, 11-1222.

My experience has been, and it is the same as my associates, that if asceptic gut, or animal ligature, is placed in an aseptic wound, which is maintained so, that wound will heal rapidly without suppuration, unless the nutrition of the tissues are modified by senile changes, or some other disturbing influence. [5] Reverdin used gut prepared by heat for eighteen months with perfect results. [6] Timothy Holmes says he has had no bad effects from the use of catgut, and [7] Watson Cheyne has seen little suppuration result from the use of this material. Of the last 600 unselected hospital cases operated upon with kangaroo tendon [8] Marcy had suppuration in only two per cent., with one death from sepsis. [9] Marsh believes that when gut is properly prepared it will cause no more suppuration than silk. If a selection of cases and circumstances can be made, such as filled the requirements of Klemm's experiment, the wound ought to invariably heal without suppuration. Abscess formation after the use of gut was a common thing, and it was due to the septic condition of the suture, but to-day it is, or ought to be, of exceptional occurrence, and the daily experience of those skilled by its habitual use, where the conditions are the fac simile of those in Klemm's experiments, is quite out of harmony with the results of the latter. In the investigations of [10] H. L. Burrell and G. R. Tucker, they found that catgut prepared by immersion in a 1 to 1000 alcoholic solution of corrosive sublimate, contains germs, and could not be relied upon; their explanation was, the hardening of the gut, prior to complete sterilization, shut up the organisms in the substance of the gut, where they were preserved alive, until set free by the swelling of the suture in the living tissues. This may also be the explanation of Klemm's results, at least his method of preparing the gut is practically the same, and open to the same objection; its insertion in the living tissue should be the practical test of its aseptic condition, and not by bouillion or similar cultures. That the great danger in the use of animal ligature is from its being septic, the result of imperfect preparation, is proven beyond cavil. Not long ago, a patient died in [11] Volkmann's clinic from anthrax, the infection arising from catgut that had been derived from an animal suffering from that disease.

[12] Marcy has reported where several patients were infected almost simultaneously from the same lot of septic gut. Marsh, and many others have reported cases that show this danger, the avoidance of which, depends upon the careful preparation of the gut. Many writers speak of uncertainty of the material, derived from the instrument makers, and point to the necessity of the surgeon preparing his own sutures. The following are some of the methods employed in the preparation of animal ligatures: Sir Joseph Lister [13] made a solution containing one part chromic acid, and 4000 parts of distilled water to which was added 200 parts of pure carbolic acid. In this solution catgut, equivalent in weight to the carbolic acid is placed, and allowed to remain 48 hours. It is then taken from the solution, dried, and stored in 1 to 5 carbolic oil, when it is fit for use.

[14] Macewen prepares his catgut by immersing it in a watery solution of chromic acid 1-5 and adding one part of this to 20 of glycerine. At the end of two months this is removed, and kept for use in 1-5 carbolic acid and glycerine.

[15] Reverdin takes crude catgut, which has not been preserved in fat, exposes it for four days to a constantly increasing temperature until it reaches a maximum of a 140° C., and then places it for a day in oil of juniper, when it is stored in alcohol.

[16] Larochette writes, at 90° C., the small gut is spoiled; at 100° C., the largest gut is spoiled, when fat is present, as it is fried in its own grease. If the fat of catgut is removed by ether and bi-sulphide of carbon, the gut will suffer no change, if gradually heated in a large oven to 100° C. If heated to 145° C., for three hours it becomes slightly burned, but is strong enough for surgical purposes. When the gut is freed from fat by the use of ether, and sterilized by heat, it becomes almost friable and is worthless. He believes 140° C. is sufficient heat to sterilize the gut; he stores it in boiled olive oil, containing 10 per cent. by weight of carbolic crystals. Catgut sterilized by heat is not quite so strong, and is less pliable.

[17] Bryant places crude catgut in a solution of bichloride 1-1001 for ten minutes, then into a weaker solution 1-1000 for 12 to 14 hours; it is then wound on bobbins, and kept in absolute alcohol.

[18] Kocher places the gut in oil of juniper for 24 hours, and stores it for use in absolute alcohol.

[19] Partridge severs the gut into one foot lengths, and places it in ether for 5 days; it is then removed and placed in Bergmann's solution, corrosive sublimate 5 grains, water, 31¼ oz., in alcohol sufficient to make one pint, and kept for ten days; it is stored for use in a solution of equal parts of ether and alcohol, saturated with iodoform.

[20] Clinton Cushing uses the best violin catgut strings, which are placed in a large open mouthed bottle filled with sulphuric ether, and allowed to remain 48 hours; when removed they are nearly white, as the ether takes out the animal oil; they are then placed in a mixture of three parts alcohol, and one part juniper oil, with the addition of three drachms of hydro-naphthol, to each quart of the fluid; the strings are allowed to remain in this mixture ten days, when they are ready for use.

[21] G. R. Fowler winds catgut on ordinary spools which have been boiled in soda, and places them in a jar containing one pint of alcohol for every fifty meters of gut; the jar is then placed in a water bath, or milk sterilizer, and the alcohol boiled for one hour. 95–97 per cent. alcohol is used.

[22] Curtillet sterilizes the catgut by heating for one half hour in a partially closed glass vessel, at a temperature of 284° F., which is gradually increased to 302° F. It is then placed in absolute alcohol, and ready for use. Thus treated, it will remain for an indefinite time, sterile, strong and pliant.

[23] Mass. General Hospital: The catgut is soaked in ether several days, and is then placed in an alcoholic solution of corrosive sublimate 1–1000. (95° alcohol.) In some cases it is sometimes boiled in alcohol in a closed jar for half an hour, and then preserved in absolute alcohol.

[24] Boston City Hospital: The catgut is allowed to stand for 24 hours in aniline oil and is then heated while still in this oil to 115° C., for 15 minutes. It is then transferred to a 10 per cent. solution in alcohol until it is soft enough for use, and is transferred to a 3-4 per cent. solution of glycerine in alcohol so as to render it less slippery.

(To be concluded.)

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SATURDAY, JULY 9, 1892.

BY-LAW IV OF THE AMERICAN MEDICAL ASSOCIATION.

The Publication of Papers and Reports.

No report or other paper shall be entitled to publication in the volume for the year in which it shall be presented to the Association, unless it be placed in the hands of the Board of Trustees on or before the first day of July. It must also be so prepared as to require no material alteration or addition at the hands of its author.

Authors of papers are required to return their proofs within two weeks after their reception; otherwise they will be passed over and omitted from the volume.

Every paper received by this Association and ordered to be published, and all plates or other means of illustration, shall be considered the exclusive property of the Association, and shall be published and sold for the exclusive benefit of the Association.

The Board of Trustees shall have full discretionary power to omit from the published *Transactions*, in part or in whole, any paper that may be referred to it by the Association, or either of the Sections, unless specially instructed to the contrary by vote of the Association.

THE URINE IN NEURASTHENIA.

In a recent number of the *Post-Graduate*, we find the report of a discussion of the clinical values of urinalysis. In it are given the maturer views of DR. C. L. DANA on that line of investigation in cases of neurasthenia. He has for many years made the routine examinations for sugar and albumen; but lately he has gone more explicitly into the relations of quantity, density and the amount of the phosphates.

A low specific gravity is found in nearly all cases of affection, and the proportion of the solids and of the urine was rather below the normal. But a dense urine may be found in one class of neurasthenics, namely, those who suffer from the lithæmic form. This latter is generally acquired in consequence of overwork, indigestion and hepatic impairment. Then a dense urine, voided in large quantity, and containing considerable proportions of solids, chiefly urea and uric acid. These have already been pointed out by DR. DANA and others as signs of the neurasthenic state. The discharge of the alkaline phosphates is governed largely by the diet, but the relation to them of the earthy phosphates is important. The author's studies have taught him that an increased proportion of the earthy phosphates implies neurotic trouble; and without seeing the person he has been able safely to indicate that the specimen had been voided by a nervous patient. In that other form of neurasthenia, where the urine was dense, there is less proportion of earthy phosphates, growing less and less as the urinary density is increased. When associated with this dense urine there is a little sugar, the quantity of those phosphates is still farther diminished. If under treatment the sugar disappears, the phosphates will return.

A French writer has reported that after epileptic attacks the quantity of phosphates show little change, but that after hysteria there is an inversion of the usual ratio existing between the alkaline and the earthy phosphates. Ordinarily this ratio is as one to two and one half or three, but after an attack of hysteria, it may be as two to two, or as three to two, the earthy phosphates are increased while the alkaline phosphates diminish. DR. DANA has examined the urine of epileptics and in regard to them has verified the statement of the French observer, but he has not yet formed an opinion as to hysterical changes in the phosphates.

THEATRES AND TUBERCULOSIS.

MR. HENRY IRVING recently spoke at a festival dinner of one of the hospitals for consumptives in London. He made merry, says the *Press and Circular*, over a letter, written to him by a medical man, suggesting that if the theatres were kept closed the hospitals for consumptives might be reduced one-half. The idea of the letter-writer was that the systems of ventilation of theatres were so villainously bad, that those who subjected themselves to incident exposures to draughts and sudden changes of temperature took their lives in their hands, when going to these places of amusement. The specific cause of tuberculosis may or may not be propagable in the various illy ventilated halls where pleasure seekers gather, but there is enough of old-fashioned truth about the belief that many a case of lung-trouble has taken its rise in the "bad cold" that was caught at the theatre. Possibly a subsequent want of care and treatment, together with some mysterious bacillary implantation at a time when it could do the utmost harm, have been necessary to convert these cases of

"cold" into phthisis, still there may be a justly chargeable contributory element for the theatre to sustain. The question of properly ventilating a place of public resort has been solved time and again by experts in that department, and it resolves itself down into a question of cost. If the money is freely supplied for the purpose, any given building can be adequately ventilated, just as certainly as it can be rendered safe against fire. But the money cannot commonly be spared for these objects—it is required to be spent upon some tower, or pinnacle, or other architectural embellishment.

THE SECOND ANNUAL MEETING OF THE AMERICAN MEDICAL TEMPERANCE ASSOCIATION.

This is the youngest of the National medical organizations that hold their annual meetings in close connection with those of the American Medical Association. It was organized during the session of the latter Association in Washington, May, 1891, and held its next annual meeting at Detroit, June 9, 1892. At the first meeting fifty-six physicians were enrolled as members, and perhaps as many more have been added since. The objects and plan of the organization are nearly identical with those of the British Medical Temperance Association, which has been in active operation several years and now numbers about six hundred members. The meeting at Detroit was held in the hall of the Young Men's Christian Association on Thursday evening June 9, 1892, and was well attended. The President, Dr. N. S. DAVIS, of Chicago, delivered an address, in the first few lines of which, he stated explicitly the objects of the Association, and then proceeded to point out the fallacy of classing the carbo-hydrates of fermentation or bacteriological production, as the alcohols, along with the carbo-hydrates of vegetable growth, as starch, sugar, oil, gum, etc., and calling them all indirect or respiratory food. His views of the histological, physiological, and therapeutic relations of alcohol were clearly stated and illustrated by reference to the experimental researches which have been prosecuted both in this country and Europe. But as the address in full may be found in another part of THE JOURNAL, each reader can peruse it for himself. DR. T. D. CROTHERS of Hartford, Conn., read a brief paper on "Heart Failure from the Medicinal Use of Alcohol, Illustrated by Cases"; and DR. I. N. QUIMBY, of Jersey City, N. J., read a paper on "Some Dangers of the Use of Alcohol in Acute Diseases." Some of the cases and facts related in these papers were highly interesting and valuable, and their presentation was followed by an earnest discussion concerning the actual value or non-value of the use of alcohol in both health and disease, in which a large number of those physicians present took an active part, and the interest was sustained until a late hour of the evening. A resolution was adopted recommending the publication of 5,000 copies of the president's address and an abstract of the proceedings of the meeting; several new names were added to the roll of membership; and a committee was appointed to report statistical facts regarding the results of the use and non-use of alcohol in the treatment of diseases at the next annual meeting of the Association.

All the officers were unanimously re-elected for the ensuing year, namely, for President, N. S. Davis, M. D., of Chicago, Ill.; Vice-Presidents, I. N. Quimby, M.D., Jersey City, N. J.; J. B. Whiting, M.D., Janesville, Wis.; F. E. Yoakum, M.D., Shreveport, La., and J. Taft, M.D., Cincinnati, Ohio. For Secretary, T. D. Crothers, M.D., Hartford, Conn. For Treasurer, G. W. Webster, M.D., Chicago, Ill.

The next annual meeting is to be held in Milwaukee, Wis., during the first week in June, 1893. The objects of this organization and the strictly scientific character of its work thus far, should command for it the earnest attention of the profession at large.

EDITORIAL NOTES.

THE HEALTH BOARDS OF CITIES.—Drs. Jacobi and Prudden, following the example of Dr. Janeway, have resigned their Health Board positions in New York City. In the editorial columns of the *Herald* of that city it is intimated that the Academy of Medicine will be called upon to pass its opinion on the existing methods of health administration, inclusive of the practice of removing capable medical men from office in order to make room for politicians. The writer adds regarding the retirement of Drs. Jacobi and Prudden: "These two physicians are eminent in their profession and their work in behalf of the public will be greatly missed. If it leads to any improvement in the methods, scope and independence of health officers, it would not be a bad thing." If it can be proved before the Academy of Medicine that competent medical men are removed on the pressure of office-seekers, the Academy should publicly and pungently criticise such action. And what is true of that body is likewise pertinent to similar representative organizations in other cities; the faithful medical official should to them be an object of pride and solicitude, who should not be left unsupported in the time of his attack and injury by malign influences of whatever nature.

ANOTHER MEDICAL DICTIONARY ANNOUNCED.—A new pronouncing dictionary of medicine, collated by Dr. J. M. Keating and H. Hamilton, is in preparation in Philadelphia, the birthplace of many lexicons. The publisher, W. B. Saunders, states that the types have been specially cast for the book, and the paper specially made; size royal octavo; price in cloth, $5. If we mistake not, each of the Philadelphia medical

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book concerns has its new diction-director, while some of them have more than one to look after. Word-book making is in the ascendancy at the present time, and not only are publishers ready to make their ventures, but there is no evident lack of ready workers in that most laborious of literary fields. From a recent article in the *New Englander* we gain a hint of explanation and a *raison d'etre*, when it states that "we are living in a markedly linguistic era, when more and better work is doing in the sphere of English philology than in any preceding era—work accomplished, it is pleasing to state, mainly by English and American scholars. One of the most pronounced forms of this modern movement is lexicography. As the closing decade of the century is entered, we find that this movement is wellnigh at its maximum, so that both at home and in England, no English book is commanding more attention than the English dictionary, and we are living more than ever in an age of words." There can be little doubt that the *Index Catalogue* of the Surgeon-General's Office, and the *Index Medicus*, have been both an incentive and an aid to the army of the lexicographers. Some of them only have the grace and gratitude to publicly admit their debt. In England, the publishers of word-books are in less active competition. The "Lexicon of Medical Terms" of the New Sydenham Society has now reached Part XVIII (Mit–Nec). Four years more will be required to finish it. Inasmuch as Part I was issued in 1878, the disparity between the early and the late numbers will afford entertainment to the critics and others who have the time to go into a comparison.

Chlorosis Treated by Stomach Washing and Creasote.—According to the *University Medical Magazine*, not enough has been seen in this country of the use of stomach washing and creasote in chlorosis. Noting the prominence of symptoms of gastric derangement present in a large number of chlorotic cases, Pick has given, in the *Wiener Klinische Wochenschrift*, the suggestion that more reliance should be placed on those remedial measures which relieve the atonic or dilated condition of the stomach than on iron. In sixteen cases, he has practiced daily the washing out of the stomach; all of these recovered in three or four weeks, whereas, they had resisted treatment by iron for a month or more. In other cases in which stomach washing was not thought expedient, he had recourse to creasote, using the following formula:

℞ Creasote, 3 grs.
Sugar of milk, 8 grs.
M. Make four capsules.
Sig. One after each meal.

The advantage derived from creasote is in its power to control the fermentative changes to which these patients are liable.

Hysteria Symptomatic of Renal or Abdominal Disease.—Leopold has expressed the opinion that hysteria is not a functional neurosis, but is the symptom of a pathologico-anatomical lesion that should be sought for and found. This cause is not by any means always in the sexual organs. Among the non-sexual causes he gives a prominent place to floating kidney and atonic condition of the bowels and of the abdominal walls. The treatment for floating kidney should be by a suitable bandage and not by fixation by suture; in which plan he has the support of Schramm and von Bergmann. In those cases in which atony of bowels exists, relief is frequently obtained by small meals, six or eight daily, with restricted fluids, repose after eating, and external massage after meals.

Vichy Water Imitations.—President Carnot, of the French Republic, and the lessor company, now holding rights in the Vichy springs, are plaintiffs in a suit against a New York syphon-water dealer. The defendant has for years been engaged in the imitation or purported imitation of waters of a certain spring, called "Grand Grille" of Vichy; the plaintiffs now ask that an injunction be granted against future infringements, and damages on account of past imitations be awarded. From this bill of complaint, it appears that the French nation is the true owner of the Vichy property, and President Carnot appears in the suit in his official capacity, as head of the French government. If the plaintiffs win in this suit, any use of the word Vichy, as descriptive of artificial waters made in this country, will be interdicted. The defense has thus far simply indicated an intention to dispute the complaint on technical grounds, such as the question of jurisdiction and the like.

Adulteration in the United States.—A writer in the Philadelphia *Star* refers to the enormous quantities of materials that are sold in this country, the only known use of which is to dilute or adulterate our food articles, and says: "It is estimated that ninety millions dollars' worth of fraudulent food-products are annually disposed of, in these United States, either mixed with good articles or sold in place of them." This represents the extent of the theft perpetrated on the consumer by men who coin fortunes with "cheap" wares. Incidentally the products of the farmer are depreciated, so that the producer feels the steal along with the consumer.

Oil of Cloves and the Mosquito.—The *Indian Medical Record* has a statement by a native surgeon to the effect that the oil of cloves is abhorrent to the mosquito. It is his habit to pour three or four drops of this oil on his pillow on going to bed. The insects never trouble him after that. Those of his family and friends who have tried the experiment, report similar gratifying results. The oil of cloves has been recommended by some observers, as an external application to allay irritation from the bites of insects.

Typhus Fever in British Cities.—From the local reports collated by the *Public Health*, it is learned that cases of typhus fever have occurred in the following cities: Carlisle, 12 cases; Dundee, 27 cases and Cork 11 cases. At Glasgow, London and Liverpool, cases have been reported, a certain proportion of which owe their origin to importation from Eastern Europe. At Carlisle, the epidemic is reported to be at an end in the *Lancet* for June 11.

DR. JULIAN J. CHISHOLM of Baltimore, has had the degree of LL.D. conferred upon him by South Carolina College of Columbia, S. C.

BARNES HOSPITAL AND MEDICAL COLLEGE.—Robert A. Barnes, who recently died in St. Louis, bequeathed more than a million of dollars to endow a hospital and found a medical college. An organization of the institution is already effected, with Dr. Chas. H. Hughes as President of the faculty and member of the Board of Trustees.

IN THE last issue of THE JOURNAL, Dr. TRUAX directs attention to what he believed to be an inaccuracy in the official report of the late meeting at Detroit. The report was made by the most reliable and experienced medical society stenographer in this city, and our attention is directed to the fact that the report as published pertaining to the appointment of the committee referred to by Dr. Truax was correct, and so decided by the Association.

ABSTRACTS.

DECADENCE OF SURGICAL ANTISEPSIS IN ENGLAND.—In the *Northwestern Lancet*, the London letter repeats the assertion, that has been made elsewhere, that London surgeons have departed from their first love for antisepsis. The writer was surprised to see the instruments taken from their cases and then dipped in a perfunctory manner in the bath; after which they were used without further precaution. At the London Hospital, another visitor, a Frenchman, at the side of the writer, expressed some surprise, but admitted that he had been told that the English surgeons are no longer the strict observers of surgical cleanliness that they once were, and that Mr. Lister is the least cleanly of them all, in point of fact, the word "dirtiest" was the one employed by the French guest—a forcible expression to say the least.

A NEW TREATMENT OF ACUTE URETHRITIS.—Drs. Cotes and Slater have contributed to the *Lancet* for February 27 some new points in the treatment of acute gonorrhœa. The patient is first of all told to empty his bladder, after which he reclines upon a couch. An endoscope tube, warmed and oiled, is then passed into the urethra. Ordinarily there is no great amount of pain produced by the passage of this instrument, but at times it may be sufficiently severe in sensitive persons to make it desirable to previously inject a 10 per cent. solution of cocaine. The urethra is then carefully cleansed by dry cotton wool, attached to a stilette, and examined with the aid of electrical illumination. The precise extent of the inflammation can be clearly seen. It is, as a rule, about five inches back of the meatus, or it may be four inches if seen as early as the third day. The implicated area is readily recognized by its swollen, bright-red appearance as contrasted with the rosy color of the uninflamed mucous membrane. It is expedient not to pass the endoscope far back of the posterior limit of the urethritis, which is usually quite sharply defined. Another cleansing is next done, so as to remove all of the discharge that can be brought away. A mop of cotton-wool wet with a solution of nitrate of silver, 10 grs. to the oz., is then passed completely through the tube and beyond it. The tube and mop are drawn out together. For the two inches nearest to the meatus a fresh mop is used, so as to thoroughly dose this very susceptible part. The pain caused by these procedures passes away in ten minutes. The patient is told to take a hot bath that night, and to remain in bed the following day. A saline purgative and an alkaline or balsamic remedy may be given internally. From four to six times daily the urethra should be injected with a simple cleansing injection.

Over forty cases treated in this way have averaged a cure in twelve days; chordee was present in a few of them. The merits of this treatment seem to be, first, that the practitioner can see the tissues which he is about to medicate; second, that the application is brought into contact with a surface that has been thoroughly cleansed; and third, that the application is made at a time when the walls of the urethra are stretched, so that its furrows and folds have been obliterated. The proponents of the treatment regard the nitrate of silver application with especial favor, for they hold that it is not only a good microbicide, but exerts a healing influence upon the diseased mucous membrane.

DOMESTIC CORRESPONDENCE.

Thyroid Dislocation of the Femur, with Integrity of the Ileo-femoral Ligament.

To the Editor of the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION:

Believing the following to be a rare, if not unique form of accident I am induced to report it:

On the morning of Nov. 20, 1891, Hugh Taylor, age 7, fell from the back of a mule. As no one saw the fall, it cannot be told how he struck the ground, but he was unable to arise on account of injury to the left hip.

I saw him two hours after the accident, and found him lying upon his back inclined to the left side. His left leg was flexed upon the thigh, and the thigh flexed upon the trunk to an acute angle, and abducted to such an extent as to rest easily upon the bed, in the position he had assumed, without any extra support. There was tension of the abductor muscles, on the inner side of the thigh. The hip was flattened. The limb was fixed so that I was not able to abduct or extend it.

Diagnosis.—Thyroid dislocation of femur, with integrity of the ileo-femoral ligament.

Having administered an anæsthetic, I placed him on his back with an assistant to steady the pelvis. Standing on his right side I grasped his thigh just above the knee with my left hand, and the left buttock with my right hand, the thumb being on the perineum. I then flexed the thigh strongly on the trunk and brought the knee across the middle line so as to throw the head of the bone, below and external to the acetabulum. Then carrying the limb upward with both hands, I attempted to reduce by extension; at the same time, as the ileo-femoral ligament was put on the stretch, rotating the limb slightly *outward* to relax the ligament and direct the head of the bone toward the socket. The first attempt failed but the second succeeded, and while in the act of rotating the limb, reduction was effected with a dull snap, audible only to myself and the nearest assistant. The limb dropped easily beside its fellow, and all the appearances were normal. Rapid and complete recovery followed.

T. B. HILL, M. D.

Ruff Creek, Pa.

THE VALUE OF MILK LABORATORIES FOR THE ADVANCEMENT OF OUR KNOWLEDGE OF ARTIFICIAL FEEDING.

BY T. M. ROTCH, M.D., OF BOSTON.

Two important factors are demanded by physicians of the present day in solving the problem of rational medicine: First, a means of saving time; second, exact methods of work.

I have long felt that the artificial feeding of infants should be reduced to a more exact system, and that in this way an endeavor should be made to rescue this important branch of pediatrics from the pretensions of proprietary foods and the hands of ignorant nurses. With this purpose in view, I have

established a laboratory in which the materials used are clean, sterile, and exact in their percentages, and are combined in any proportion that the physician may wish to prescribe. Laboratories of this kind should be established everywhere, and physicians should write prescriptions for their infant patients' food and put them in the hands of the milk-modifier in his laboratory, just as they write for combinations of drugs in disease, and entrust them to the pharmacist in his drug shop. As the result of clinical experience in infant feeding, I have reached the conclusion that slight changes in the percentages of the three elements of milk of which we have most accurate knowledge, namely: the fat, sugar and albuminoids, have an important bearing upon the management of the digestion and nutrition of infants.

In analyses of milk from seven women the fat, sugar and albuminoids varied to a marked degree, and yet the infants all digested well and throve on their individual percentages, while what agreed with one produced serious symptoms in another. It seems, therefore, that so far as milk is counted upon as a food, it should be understood to be a general name of the food for the infant, just as dinner is a general name of food for the adult.

This general dinner (milk) of the infant, should also be modified in its various parts to suit the digestion of the individual infant.

Perhaps it would be of interest to know what materials were needed, and what processes were gone through with, in carrying out the prescription of the physician.

A laboratory such as that described has already been established in Boston, and is in successful operation, a number of physicians having found it to be an indispensable adjunct to their daily practice.

An important matter is the careful supervision of herds of cows especially selected as to breed and systematically fed, so that the analysis of their milk should be of an almost unvarying percentage. The morning's milk of these cows, milked into glass and kept scrupulously clean, is rapidly cooled and in a few hours delivered at the laboratory. The atmosphere of the laboratory is kept pure and fresh by means of a large fan that keeps up a constant outward current of air. The laboratory itself is lined with white tiles, and contains a separator by means of which a stable 16 per cent. cream can be quickly obtained from the milk. There is also a large sterilizer into which not only steam can be introduced, but in which the milk can be exposed to high or low temperatures, at the will of the modifier.

Having once obtained a pure, clean skimmed milk and cream of a stable percentage, it is merely a matter of mathematic calculation to combine these fluids in such proportions as to produce a mixture in the percentage of fats and albuminoids prescribed by the physician.

The sugar percentage is obtained in like manner by using a carefully prepared 20 per cent. solution of milk sugar and distilled water.

Diagrams were made to show the prescriptions written by the physicians in fat, sugar and albuminoid percentages, the same prescriptions translated into drachms and ounces by the milk-modifier, and the figures returned by the chemist to whom the modified milk was sent to test the accuracy of the modifier's calculations.

I have had a large number of test analyses made, so that there is no longer a doubt but that fairly exact combinations can be made in this way.

As the chemistry of the mineral matter in woman's milk is so little known, it is better to ignore that element for the present. Three figures only need be remembered, corresponding to the percentages of fat, sugar and albuminoids in average human milk—namely: 4, 7 and 1.50.

Starting with these figures, the physician can then easily change one or more of them, either to increase or decrease, according to the need of the especial infant.

As objection has been made to sterilizing at 212° F., this could just as well be done at the safer and lower temperature of 167° F. in the laboratory sterilizer.—*Medical News.*

NECROLOGY.

Dr. Herbert Fearn, of Brooklyn, died June 25, 1892, aged 58 years. He was born in England, but was brought to this country while a child. His medical education was obtained in New York City, at the now defunct college on Thirteenth street with which Carnochan, Peasly and Fordyce Barker were identified, graduating there in 1857. He was a member of numerous societies, accepting official responsibilities in a few of them. Among these were the Royal Arcanum and the Central Reform Association, a taxpayers' league for the repression of dishonesty in civic affairs. He read before the Kings County Medical Society, in 1871, a paper on the use of veratrum viride in large doses as a substitute for blood-letting in puerperal convulsions, which was probably an original proposition with him. Many physicians subsequently reported favorable results, and Dr. Fearn was led to believe that not a few lives of mothers, and infants as well, had been saved by an heroic dosage of veratrum. The cause of Dr. Fearn's death was fatty degeneration of the heart. He was an earnest, thoughtful and considerate man and was constantly employed upon the welfare of his fellows.

Death of an Eminent Medical Author.

The death of Sir William Aitken, of Netley, removes a pathologist and medical author of the first rank. The American profession were familiar with his merits, through his medical treatise, first issued in the sixties and which passed through seven or more editions in England and this country. He was for many years the professor of pathology at the Army College at Netly, and an examiner in medicine for various public services. He was a member of the Royal Society and was made a Knight in honor of the Queen's jubilee in 1887, and in recognition of his services to military medicine and sanitary science. In the latter field he had been a co-worker with the late Professor Parkes. His death took place on the 27th ult., at which time he was in his sixty-seventh year.

BOOK REVIEWS.

Proceedings of the Florida Medical Association. Session of 1891. Printed for the Association at Jacksonville, 1891.

This pamphlet of eighty pages gives a report of the annual meeting at Pensacola, held in April, 1891. The growth in the society is indicated by a three day convention fairly well attended and by contributions from numerous sources. The Association has had its importance increased by the workings of the Medical Examination legislation, and the address of the President, Dr. Thomas P. Gary, of Ocala, shows the importance of utilizing to the utmost the protective properties accorded to the regular profession of Florida, under Examination Acts. That State, he says, is prospering, is growing in wealth and reputation; and from that very fact invites the attention of quacks and humbugs, against whose presence in the State the Medical Boards have been called into existence to protect the public. Dr. James C. Neal, of Lake City, contributes a paper on Legalized Crime in Florida, in which he refers to the ignorant practice of midwifery by the rural dame and black granny. As a result of extensive correspondence and his own observation, he thinks that at least fifty mothers and twice as many infants are annually lost through these ignorant persons. A list of forty cases is given to show the various repugnant practices that are indulged in, both as to the mothers and their offspring. Dr. Neal points out the need of a change in the laws governing this subject, so as to obliterate the quasi-protection that at present seems to forbid the prosecution of ignorant but homicidal midwifery. A long report on leprosy by Dr. R. P. Daniel is presented on behalf of the State Board of Health growing out of unproven statements, made through the press, that there were numbers of lepers at Key West and Tampa, engaged in the manufacture of cigars. The truth of the matter appears to have reduced the number of lep-

rous persons down to six or eight at any one time; and of late years, through death, that number has been decreasing. These unfortunates are kept off the street, and no instance is known where the disease has been communicated to any other member of the family. The author believes that the Key West cases were imported from Havana, "a nursery of infection" that is dangerously near that part of our domain. The writer truthfully remarks that it is the duty of the State, and not of the town or county where these cases chance to become located, to make provision for leprosy. Louisiana has done its duty in this regard, and already has its hospital and thus cares for those who, through no fault of their own, become outcasts from society and the victims of a lingering, loathed malady. These lepers are sick people and not criminals; the spirit of our times and country forbids that they shall be injured by harsh treatment or by a studied neglect.

SELECTIONS.

HOT AIR REGISTERS IN FLOORS.—We have noticed on several occasions a most disgusting, if not dangerous, practice arising from placing hot air registers in floors. Reference is made to using the register for the purpose of a cuspidor. If attention is paid to this, one will be surprised to note the number of persons guilty of this act.

Recently in a hotel heated by natural gas, and having a large hot air register in the floor, we saw not less than half a dozen persons discharge their saliva into it. One of these was the proprietor of the hotel, an old man suffering from chronic bronchitis with a copious muco-purulent expectoration. One can scarcely imagine anything more horrible. And if we consider that consumptives may sometimes cast their expectoration into the register, the danger of the practice becomes apparent; for a more efficient method of scattering germs of tuberculosis through the air of an apartment could not be devised.

The floor is seldom or never the place for a hot air register. With the greatest possible care a considerable amount of dirt will collect in it, polluting the air more or less, that enters the room. In the absence of cuspidors, it always offers a tempting place for the chewers of tobacco to dispose of their spittle without betraying their filthy habit. Persons coming in from out of doors, with wet, dirty feet, will nearly always stand over the register to dry their shoes, affording another source of air pollution. Other objections present themselves, but those given should suffice to condemn placing hot air registers in floors, and especially in public places.—*Monthly Sanitary Record* (Ohio).

IT HAS been decided that the next Congress of Food Analysts shall take place in Vienna in 1894. A committee has been appointed to take steps for the preparation of "A Codex Alimentarius," in accordance with a resolution passed at the previous meeting of the Congress in 1891.

DISCRIMINATING AGAINST TWO-YEAR COLLEGES.—The Oregon State Board of Health has adopted a rule defining a medical institution in good standing to be one requiring three regular sessions of six months each, covering three years' time. A Dr. T. Barwood was rejected on the ground that the school from which he graduated does not have such a three years' course. He brought the case before the circuit court, which rendered a decision adverse to the power of the State board to make such distinction. On appeal to the supreme court the decision was overruled and the authority of the State board sustained.

THE TERM "REGULAR" DEFINED.—The Surgeon General of the United States rendered a decision last fall, which, coming from so high an authority, ought to satisfy the most exacting for a definition of the word "regular."

In the army regulations there is a paragraph which specifies concerning the qualification of the physician being admitted, and says he must be a graduate of a regular medical college. A member of Iowa Homœopathic Medical Society wrote a letter to the Surgeon General, asking him to state definitely what was meant by the word "regular."

The answer was as follows: "The term regular as used in paragraph 1544 Army Regulations, is used in its most comprehensive sense, as indicating a college well equipped and prepared to cover the whole ground of the science and art of medicine in its teachings, and requires not less than a three years' course of study to secure its diploma."

MISCELLANY.

THE MEDICO-LEGAL SOCIETY OF CHICAGO.—At the annual meeting held June 4, officers were re-elected as follows: President, Judge Oliver H. Horton; vice-presidents, Dr. Daniel R. Brower and Dr. James Burry; treasurer, Dr. Joseph Matteson; secretary, Dr. Archibald Church.

OFFICIAL LIST OF CHANGES in the Stations and Duties of Officers Serving in the Medical Department, U. S. Army, from June 25, 1892, to July 1, 1892.

Capt. William O. Owen, Jr., Asst. Surgeon U. S. A., is granted leave of absence for one month, with permission to apply for an extension of one month.

First Lieut. Frank T. Meriwether, Asst. Surgeon U. S. A., now on duty at Ft. Adams, R. I., will report in person to the commanding officer, Madison Bks., N. Y., for temporary duty at that post, during the absence of Capt. Henry S. Turrill, Asst. Surgeon U. S. A.

First Lieut. Charles F. Mason, Asst. Surgeon U. S. A., on being relieved by Capt. Raymond, will report in person to the commanding officer, Ft. Snelling, Minn., for duty at that post.

Capt. Edward Everts, Asst. Surgeon U. S. A., is relieved from duty at David's Island, N. Y., and will report in person to the commanding officer, Ft. Robinson, Neb., for duty at that post relieving Capt. Henry I. Raymond, Asst. Surgeon U. S. A. Capt. Raymond, on being relieved by Capt. Everts, will report in person to the commanding officer, Ft. Washakie, Wyo., for duty at that post, relieving First Lieut. Charles F. Mason, Asst. Surgeon U. S. A.

First Lieut. Champe C. McCulloch, Jr., Asst. Surgeon U. S. A., now on duty at Ft. Sam Houston, Texas, will report in person to the commanding officer, Ft. Hancock, Texas, on July 1, 1892, for temporary duty at that post. By direction of the Secretary of War.

First Lieut. Henry C. Fisher, Asst. Surgeon (Ft. Yates, N. D.), is granted leave of absence for twenty days.

OFFICIAL LIST OF CHANGES in the Medical Corps of the U. S. Navy, for the Week Ending July 2, 1892.

Asst. Surgeon C. P. Baggs, ordered to Naval Hospital, Mare Island, Cal.

Surgeon M. C. Drennan, from Naval Academy and to Navy Yard, Norfolk, Va.

Surgeon G. F. Winslow, from Navy Yard, Norfolk, Va., and wait orders.

Asst. Surgeon C. F. Stokes, from Naval Hospital, Mare Island, Cal., and wait orders.

Asst. Surgeon G. A. Lung, from Naval Hospital, New York, and to U. S. S. "Minnesota."

Asst. Surgeon G. H. Barber, from U. S. S. "Minnesota," and to Naval Hospital, New York.

P. A. Surgeon V. C. B. Means, from Navy Yard, New York, and to Naval Hospital, Norfolk, Va.

P. A. Surgeon N. H. Drake, from Naval Hospital, Chelsea, Mass., and to Navy Yard, New York.

Asst. Surgeon J. E. Page, from receiving ship "Independence," and to the U. S. S "Thetis."

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